The Dissertation Committee for Katherine Cox Certifies that this is the approved version of the following dissertation:

THE SCIENCE OF SOUND IN THE POETRY OF JOHN MILTON

Committee:

John P. Rumrich, Supervisor

J.K. Barret

Blair Hoxby

Eric S. Mallin

Hannah C. Wojciehowski

The Science of Sound in the Poetry of John Milton

by

Katherine Cox, B.A.; M.A.

Dissertation

Presented to the Faculty of the Graduate School of

The University of Texas at Austin

in Partial Fulfillment

of the Requirements

for the Degree of

Doctor of Philosophy

The University of Texas at Austin

May 2016

Dedication

To my mother and father for their love and unfading belief in me.

Acknowledgements

It gives me great pleasure to acknowledge and thank my supervisor and dear friend John Rumrich for directing this dissertation. Without his incomparable mentorship I could not have written it. Six years ago in a Milton seminar at UT, I wrote an inelegant paper for John, who charitably gave me an A and showed me through his feedback how to do better. Over the years, as he shepherded my way through various projects, including my masters report and first publication, John helped me steadily improve my writing. For his extreme patience and diligence in this office, which many advisors are not inclined to perform, I heartily thank him.

Of the many ways John's mentorship enabled me to embark on and complete this dissertation, two stand out in my mind. The first is John's confidence in my abilities. He never discouraged me from attempting the ambitious research I proposed, and with his constant assurances I could hardly doubt myself. Secondly, I am indebted to John for several critical insights that enriched this dissertation. He pointed me towards, for example, Athanasius's writings on the tradition of Satan as prince of the air, which yielded many fascinating connections with Milton's poetry. John's unflagging intellectual engagement with my dissertation added significantly to the enjoyment I derived from writing it. I am lucky to have been taught by a person of such intelligence, wit, kindness, and integrity.

I am also greatly indebted to the other members of my committee, J.K. Barret, Blair Hoxby, Eric Mallin, and Hannah Wojciehowski. J.K. and Hannah have both thoughtfully engaged with my project since its beginnings and pushed me to develop my ideas in fruitful ways. Eric's incisive feedback improved Chapter 3 of this dissertation,

and his frequent words of encouragement were a welcome sign of confidence throughout the process. I am particularly grateful for Blair's continual support from afar, his valuable scholarly advice, and the kindness he has shown me by traveling to Austin to participate in my defense. By Blair's invitation, I was able to attend the Milton in the Long Restoration conference at Stanford last year, where I exchanged ideas related to this project with many esteemed Miltonists. I am thankful for Blair's longtime friendship and trustworthy council on professional matters. My entire committee promoted my development as a scholar in ways that extend beyond the dissertation.

Another brilliant and greathearted teacher of mine, the late J. Martin Evans, deserves remembrance here for his impact on my life and scholarship. It was because of Professor Evans' instruction that I grew to appreciate the magnificence of Milton's poetry and decided to pursue graduate studies in literature. I will always be grateful to him for taking me under his wing and regarding my work with seriousness and interest.

I also want to thank the UT College of Liberal Arts and English Department for the fellowships I received towards completing this dissertation. The time these scholarships allowed me to dedicate to my project, which required substantial research, was crucial for its completion. Finally, my parents and sisters deserve manifold thanks for keeping up their faith in my work and inspiring me daily by their example. My mother and father have read with enthusiasm much of this dissertation. I thank them for accompanying me, emotionally and intellectually, on the path to its completion. I am deeply beholden to them for supporting my doctoral studies and everything I endeavor in life.

The Science of Sound in the Poetry of John Milton

Katherine Cox, Ph.D.

The University of Texas at Austin, 2015

Supervisor: John P. Rumrich

"The Science of Sound in the Poetry of John Milton" reconsiders T. S. Eliot's now axiomatic claim that Milton is an exceptionally aural poet in light of the emergence of acoustics in the seventeenth century. Although Milton has been credited with a singularly aural imagination, the fact that his poetry abounds with representations of sound, surprisingly, has been overlooked. This study argues that the science of acoustics informs Milton's distinctly aural poetics. The experimental study of sound arose in the seventeenth century from the interaction of diverse fields, namely music, meteorology, magic, and mechanics. Milton adapts concepts from each of these sciences to formulate his own poetic and philosophically rigorous conception of sound. A central thesis of this dissertation concerns the interplay of occult and mechanical theories of sound in Milton's works. While allowing that sound may be transmitted through the mechanical operation of air—a central tenet of experimental acoustics—Milton also retains ideas from occult traditions that suggest sound is a spirituous substance susceptible to magical and spiritual interference. Milton's portrayal of sound as a living part of the universe thus illustrates his monism. Chapter 1 establishes that Milton derives an oral and ecological understanding of the voice from works of classical meteorology, such as Aristotle's *Meteorologica* and Pliny's *Natural History*. The second chapter posits that the moral dilemmas confronted by the heroine of Milton's 1634 masque, *Comus*, are chiefly aural

in nature. In the interest of preserving her chastity, the Lady must correctly choose when to speak, sing, listen, or ignore what she hears. Informed by the acoustical theories of Francis Bacon and Marsilio Ficino, for example, her judgments evaluate their influential models of sound. The third chapter argues that Milton's demonology is influenced by Satan's title in orthodox Christianity as "prince of the power of the aire" (Ephesians 2:2) and the related belief that devils cause inclement weather. The final chapter proposes that Satan employs his meteorological power to instrumentalize various environments and organisms in *Paradise Lost*—most notably the pipe organ in Hell and the serpent—using both pneumatic and mechanical methods.

Table of Contents

Introduction 1

Chapter 1: "Infant Cries": Meteorological Voices in the Early Poems 15

I. "Scorn the sordid world, and unto heaven aspire" 15

II. "Through middle empire of the freezing air / He wandered long" 21

III. "So sweetly sung your joy the clouds along" 29

IV. "To his celestial consort us unite" 48

Chapter 2: Early Acoustic Theory and the Aural Soul in *Comus* 61

I. "With puissant words, and murmurs": The Power of Incantation 78

II. The Hazardous Acoustics of "spungy ayr" 84

III. "Not a waste or needless sound": The Aural Economy of Spirit 98

Chapter 3: The Power of the Air in Milton's Epic Poetry 111

I. "The air / The realm itself of Satan" 116

II. Clouded Minds and Bodies 128

III. The Meteorology of Satanic Expression 134

Chapter 4: Satanic Acoustics in *Paradise Lost* 141

I. The Satanic Properties of "sonorous metal" 146

II. Spirits, Magic, and the Early Modern Instrument 150

III. Devils and Cannons, "implements of mischief" 166

IV. Serpent, "instrument / of mischief" 172

Conclusion 177

Bibliography 188

Introduction

Some of the last lines of poetry Milton ever wrote contemplate the power of sound to captivate listeners and even suspend time. Added to the beginning of Book 8 in the second edition of *Paradise Lost* (1674), these lines give an account of Adam listening to Raphael after he concludes his story of the world's creation: "in Adam's ear / So charming left his voice, that he awhile / Thought him still speaking, still stood fixed to hear."[1] Apart from commending Raphael's musical voice, these details raise questions about the physicality of sound, its journey from its source to the ear, and its ability to prolong the impression of hearing. The addition of this evocative image of aural perception to *Paradise Lost*, in what was possibly Milton's final act of authorship, epitomizes the poet's persistently acoustical imagination.

Scholars have long acknowledged the sonority of Milton's blank verse, but the prevalence of aural representation in Milton's poetry has, surprisingly, been overlooked.

[1] John Milton, *Paradise Lost*, ed. Alastair Fowler, 2nd ed. (London and New York: Longman, 1998), p. 428, book 8, lines 1-3. Subsequent references to *Paradise Lost* follow this edition and will appear parenthetically in the text and notes by book and line number. I would like to thank James Grantham Turner for pointing out to me that these were among the last lines Milton composed.

Sound is fundamental to Milton's most beloved art forms, poetry and music, and increasingly defined his experience of the world as he lost his sight. The field of acoustics, which gradually emerged in the seventeenth century and was pioneered by experimentalists familiar to Milton, such as Sir Francis Bacon and Galileo Galilei, provided inspiration and theoretical grounding for Milton's poetic conception of sound.[2] "The Science of Sound in the Poetry of John Milton" investigates Milton's engagement with ideas of sound from the disparate intellectual traditions in early modernity that gave rise to the science of acoustics: meteorology, music, occult philosophy, and mechanics. In demonstrating the function and evolution of these acoustic theories in Milton's poetry, this study provides a historical basis for T. S. Eliot's well-known and not entirely laudatory claim that Milton was an exceptionally aural poet.[3]

A handful of books, most recently Joanna Picciotto's *Labors of Innocence in Early Modern England* (2010), establish that Milton had substantial knowledge of science as well as ideological affinities with the new experimentalism. My research supplements such scholarship by focusing on the relatively neglected fields of meteorology and acoustics, which play a shaping role in Milton's poetics, yet are typically overshadowed by optics and astronomy in surveys of the Scientific Revolution

---

[2] Milton quotes Francis Bacon in *Areopagitica* (*The Complete Poetry and Essential Prose of John Milton*, eds. William Kerrigan, John Rumrich, and Stephen M. Fallon [New York: The Modern Library, 2007], 948). In the same essay Milton reveals that he visited Galileo in Italy, and laments that the Inquisition muzzled such a learned man (950). His sympathy for the Italian philosopher extends beyond this comment. In *Paradise Lost*, for instance, he alludes three times to the "Tuscan artist," in each case providing tantalizing glimpses of what he may or may not have observed through his optic glass (1.287, 3.588-91, 5.261-63). Given these poetic tributes to Galileo—which Milton granted to no other contemporary—it is likely that he was also aware of Galileo's revolutionary work in acoustics.

[3] See T. S. Eliot, "Milton I," in *On Poetry and Poets* (1957; reprint, New York: Farrar, Straus & Giroux, 1970), 156-164.

(if not omitted altogether).[4] Fundamental changes occurred in the way philosophers studied sound during and directly prior to Milton's career. As one of the most scientifically literate poets of the seventeenth century, Milton must have been aware of these developments. His statement that in the 1630s he often went to London "to learn something new in mathematics, or in music, which at that time furnished the sources of my amusement," suggests that Milton was not content to know the status quo, but sought out the newest discoveries in these fields.[5] That contemporary theorists were applying a different kind of mathematics to music for the first time in centuries must have excited him. René Descartes' *Compendium musicae* (1618) and Johannes Kepler's *Harmonices Mundi Libri V* (1619), for example, discarded the traditionally arithmetical method of analyzing musical consonance and opted for a more geometrical approach.[6] These two texts may well have informed Milton's studies in this period.

---

[4] Meteorology and acoustics are not mentioned in *Science, Literature and Rhetoric in Early Modern England*, eds. Juliet Cummins and David Burchell (Aldershot, England: Ashgate, 2007), which focuses on literary presentations and the rhetoric of the Royal Society as well as galvanizing figures of the Scientific Revolution, including Boyle, Hobbes, and Cavendish. Neither science figures in collections that reexamine the narratives that have dominated the historiography of science in the seventeenth century, such as *Reappraisals of the Scientific Revolution*, eds. David C. Lindberg and Robert S. Westman (Cambridge: Cambridge Univ. Press, 1990) and *Rethinking the Scientific Revolution*, ed. Margaret J. Osler (Cambridge: Cambridge Univ. Press, 2000).

[5] Milton, *Second Defence of the People of England* in *The Works of John Milton*, gen. ed. Frank Allen Patterson (New York: Columbia University Press, 1933), 8:1-255, 121.

[6] Kepler's *Harmonices Mundi* was the more radical and fully conceived of the two treatises. It uses geometry to provide a scientific rationale for the difference between consonances and dissonances, which had been unsatisfactorily explained by Gioseffo Zarlino's *senario*. In addition, Kepler attempted to find a explanation for why the soul perceives the sounds produced by certain, mathematically derived intervals as more pleasurable or beautiful than others. Descartes' *Compendium* is far more indebted to Zarlino's system, which was thoroughly Pythagorean even though he technically derived the consonant intervals in terms of geometry. Both works are discussed in detail as well as compared in H. F. Cohen, *Quantifying Music: The Science of Music at the First Stage of the Scientific Revolution, 1580-1650* (Dordrecht: D. Reidel Publishing, 1984), 13-34 and 161-6.

In many respects, Milton's interest in sound was of a piece with contemporary research on acoustics. Like so many other passages of his poetry that allude to sound, the example from *Paradise Lost* above registers a philosophical engagement with its subject. The cause of Adam's aural experience is carefully examined with the purpose of explaining the effect of his delayed response to Raphael. This reasoning produces the conclusion that human senses, even the mind itself, can be tricked by sound. Adam "thought [Raphael] still speaking" even when he no longer was. The potential for sound to cause the ear to misapprehend reality is a problem that Milton examines elsewhere with the tools of occult and experimental philosophy.

The next line gets at a more central crux in Milton's thinking on sound. When Adam eventually realizes Raphael has left off talking, he revives "as new waked" (8.4). In addition to echoing Raphael's account of how the world came to be, these are the precise words Adam will use later in Book 8 to describe his first moments on the earth: "*As new waked* from soundest sleep /…I found me" (8.253, emphasis added). By associating the scene of listening at the opening of Book 8 with that of man's beginning, Milton seems to imply two seemingly contradictory things about highly affective or beautiful sound: complete absorption in such sound approximates a primal state of sleep, even non-existence. On the other hand, in hearing compelling sounds one experiences *literal* recreation. By enthralling the ear, sound wields the power to take away and restore life. Milton was deeply affected, even troubled by this paradoxical concept, which combines elements of the myth of Orpheus with common beliefs about ecstasy (a state of spiritual rapture that may be induced by music). Even as it teaches, as in the case of

Raphael's voice, sound deceives the sense. How then can we trust what we hear, and when should we stop listening? What enables sound to overpower the judgment? What *is* sound?

These questions were perhaps more vexed in Milton's day than at any other point in history, simply because during the Scientific Revolution the assumptions of scholasticism were tested often in the absence of fully developed alternatives. Prior to the Renaissance there was little real consensus among theorists about the nature of sound, but a few elegant models that gave the impression of explaining or simplifying aural phenomena dominated discourse on music.[7] In Boethius's *De institutione musica*, for instance, the chapter on hearing presents an influential analogy for thinking about the transmission of sound: the impulse created by a sounding object in the air moves the air next to it, which moves the air next to it and so on, just as a stone dropped in water creates a circular wave that fades as it moves outward.[8] By grouping music with

---

[7] Charles Burnett, "Sound and its Perception in the Middle Ages," in *The Second Sense: Studies in Hearing and Musical Judgement from Antiquity to the Seventeenth Century*, eds. Charles Burnett, Michael Fend and Penelope Gouk (London: The Warburg Institute University of London, 1991), 43-69, provides an overview of inconclusive and mostly scholastic perspectives on sound from the thirteenth and early fourteenth centuries. The texts from this period that focused on the philosophy of sound in contrast to music theory per se, are much more obscure than Boethius's *De institutione musica*. Medieval music theory, moreover, was more clearly linked to the acoustical experiments of the sixteenth and seventeenth centuries, whose investigations led to a modern science of sound.

[8] This analogy precedes *De institutione musica*, dating back to the Stoic philosophy (Burnett, "Sound and its Perception," 56n101). Here is the relevant passage as it appears in Boethius: "Nunc quis modus audiendi sit, disseramus. Tale enim quiddam fieri consuevit in vocibus, quale cum [in] paludibus vel quietis aquis iactum eminus mergitur saxum. Prius enim in parvissimum orbem undam colligit, deinde maioribus orbibus undarum globos spargit, atque eo usque dum defatigatus motus ab eliciendis fluctibus conquiescat. Semperque posterior et maior undula pulsu debiliore diffunditur. Quod si quid sit, quod crescentes undas possit offendere, statim motus ille revertitur et quasi ad centrum, unde profectus fuerat, eisdem undulis rotundatur. Ita igitur cum aër pulsus fecerit sonum, pellit alium proximum et quodammodo rotundum fluctum aeris ciet, itaque diffunditur et omnium circum stantium simul ferit auditum. Atque illi est obscurior vox, qui longius steterit, quoniam ad eum debilior pulsi aëris unda pervenit"; *De institutione*

arithmetic, geometry, and astronomy, the four subjects of the *quadrivium*, Boethius followed Pythagorean and Platonic traditions, which emphasized the mathematical or numerical properties of pitched sound. Thus, throughout the Middle Ages, the ratios that make up the Pythagorean consonances—musically pleasing intervals such as the octave, the fourth, and the fifth—were seen as the most significant properties of sound. Indeed, since Pythagoras concluded that these numbers were mystically involved in the structure of the universe, the concept of harmony was thought to organize every aspect of life. This idea was enshrined in Boethius's discussion of the *musica mundana*, the music of the spheres, whose harmonic principles were regarded as the highest subject of musical science.

By the Renaissance, however, changes in musical practice and natural philosophy as well as influences from traditions uncovered by humanist scholarship began to transform the science of music and, concomitantly, approaches to the study of sound.[9] A number of historical investigations, including H. F. Cohen's *Quantifying Music: The Science of Music at the First Stage of the Scientific Revolution, 1580-1650*, describe how the ancient concept of consonance and other measures of musical sound were revised in the late Renaissance as philosophers turned increasingly to mathematics, mechanics, and

---

musica, in *Anicii Manlii Torquati Severini Boetii De Institutione Arithmetica Libri Duo De Institutione Musica Libri Quinque*, ed. G. Friedlein (Leipzig: 1867), 175-371, 200, I.14.

[9] Starting in the late-sixteenth century, for example, the Pythagorean explanation of consonance, which posited that acceptable musical intervals are based on ratios containing a limited set of mystical integers, was replaced by the coincidence theory of consonance, as it is known today, which explains that the relative frequencies of vibrating strings determine how pleasurable their combination will sound.

experiment to investigate natural phenomena.[10] Penelope Gouk's *Music, Science, and Natural Magic in Seventeenth-Century England* stands apart from these surveys for its inclusion of natural magic as a major background in the history of early modern acoustics.[11] After 1600, natural philosophy and music became less speculative and more firmly grounded in practice. Gouk argues that these parallel changes in music and science were not only mutually informed, but also inherited from the occult philosophy known as natural magic, which often used experimental means to investigate and manipulate nature.[12] Gouk's historically and culturally attentive treatment of the subject of music underscores the sheer number and variety of influences that contributed to its revolution and the simultaneous founding of acoustics at the beginning of the seventeenth century. In addition to the experimental philosophers, Gouk points out, musicians, artisans, magicians, mathematicians, instrument makers, machinists, and others were involved in forging a new understanding of sound.

As both a poet and the son of a musician, and thus someone who understood the synergism between sound and artistry, Milton can hardly be thought to derive his notion of sound entirely from science as we currently understand it, nor was his idea of sound

---

[10] H. F. Cohen, *Quantifying Music: The Science of Music at the First Stage of the Scientific Revolution, 1580-1650* (Dordrecht: D. Reidel Publishing, 1984). See also Paolo Gozza, ed., *Number to Sound: The Musical Way to the Scientific Revolution* (Dordrecht: Kluwer Academic Publishers, 2000) and Frederick Vinton Hunt, *Origins in Acoustics: The Science of Sound from Antiquity to the Age of Newton* (New Haven: Yale University, 1978).

[11] Penelope Gouk, *Music, Science, and Natural Magic in Seventeenth-Century England* (New Haven: Yale University Press, 1999).

[12] Gouk, *Music, Science, and Natural Magic*, 4-5, 10-14.

delimited by experimental programs of acoustical research.[13] Instead of aligning Milton uniformly with the new scientific paradigms, therefore, I argue that occult and other pre-modern understandings of sound enable Milton to examine the moral and spiritual properties of acoustics. Early works such as *At a Solemn Music*, the Italian poems addressed to Leonora Baroni, *At a Vacation Exercise*, and *The Nativity Ode*, for example, each may be seen as rephrasing the same question: can earthly sounds potentially contain or convey divine substance? Milton's effort to understand sound in these poems as potentially ensouled or living, and yet firmly anchored in and constituted by the atmosphere, points to his developing animist materialism, which has been well documented by Stephen M. Fallon.[14]

Yet, during Milton's lifetime, his notion of sound as both material and spirituous was increasingly threatened by the mechanical philosophy. A few lines from Descartes' *Principles of Philosophy* (1644) convey the hostility of the mechanical school of thought to Milton's monism: "we perceive by our senses nothing in external objects except their figures, sizes, and movements….[L]ocal movement not only produces the feeling of titillation or pain, but also that of light and sounds."[15] By this account sound is not an entity that exists independently of the perceiver; it has no distinct material or spiritual

---

[13] One such program, of which Milton almost certainly was aware, is Francis Bacon's plans for the experimental discipline he called the "Acoustique Art," outlined in the second and third centuries of *Sylva sylvarum* (1626). Bacon uses the term for this art, marking the inception of a science that would take shape over the century, in his *Advancement of Learning* (1605); see Gouk, *Music, Science, and Natural Magic*, 157-9.

[14] *Milton Among the Philosophers: Poetry and Materialism in Seventeenth-Century England* (Ithaca: Cornell University Press, 1991), 79-110.

[15] René Descartes, *Principles of Philosophy*, trans. Valentine Rodger Miller and Reese P. Miller (Dordrecht: Kluwer Academic Publishers, 1982), p. 281, IV.198.

properties by which thought or feelings are borne into the mind; sound is simply the brain's translation of a motion of the air that in turn moves certain nerves in the body. Early acoustic theory, however, was less decisive than Cartesian mechanics on the external reality of sound, and in its waverings, I argue, Milton found source material both for reconciling the principles of the new mechanical philosophy with his own vitalist conception of matter and for examining the aural substance of poetry itself. Deriving his representation of aural phenomena from old and new paradigms of science, Milton accepts certain features of new acoustic theory without granting its main premise, that sound is a mechanical movement of dead air.

Comus's description of the Lady's song in Milton's 1634 masque suggests how Milton squares mechanical explanation with his belief that sound has an animate existence outside of the mind: "Sure something holy lodges in that breast, / And with these raptures *moves the vocal air*."[16] The singer initiates a motion in the air, but the medium itself is "vocal." Sound exists in the air before it reaches the mind because the atmosphere is alive and therefore expressive. In Chapter 2, I show that *Comus* portrays acoustical phenomena as directly affected by the quality of the atmosphere, which the masque depicts as thick, spiritually active, and full of dense fog. The potential for natural and supernatural manifestations of air to interrupt, corrupt, or manipulate acoustics was so troubling to Milton that, in his mature poetry, atmospheric power ranks as the defining feature of evil.

---

[16] Milton, *The Complete Shorter Poems*, John Carey, ed., 2nd ed. (Harlow, England: Longman, 2007), p. 193, lines 245-6; emphasis added.

Thus, as central to Milton's thinking about sound as the study of music is the heterogeneous body of thought that surrounded the concept of air in the early modern period. Meteorology, theology, as well as artistic representations, rituals, and popular opinions pertaining to atmosphere, all contributed to a culturally defined understanding of the air. One particularly enduring idea about the air in Western thought was that it consisted of vapors and mist. From a modern point of view vapors are distinct, aqueous phenomena that manifest in the air or involve air; mist and air are not interchangeable concepts. But in Homeric texts and early Greek literature, the word *aer*—the etymological precursor to "air"—signified mist or cloud.[17] Peter Kingsley has argued that the earliest known specification of the four elements, Empedocles' four roots, which are ambiguously identified by the names of four deities, did not include *aer* as is commonly thought, but rather the element of *aither*.[18] Kingsley explains that *aither* was the Presocratics' term for common air or atmosphere. (It was not until later antiquity that *aither* lost its broad association with the atmosphere, and the Stoics classified it as a special kind of fire.) The definition of *aer* as a misty subset of atmosphere was eventually superseded by its association with the greater atmosphere, and, over time, it assumed its familiar place with the other three elements.[19] In the early modern period, centuries after the meanings of these terms shifted, the word air might still connote dampness, mist, or vapor. Milton, who knew Greek and was deeply influenced by Homeric literature, often revived this ancient sense of the air in his works. For example, in comparing the

[17] Peter Kingsley, *Ancient Philosophy, Mystery, and Magic: Empedocles and Pythagorean Tradition* (Oxford: Clarendon Press, 1995), 26.
[18] Ibid., 13-23.
[19] Ibid.

embracing Adam and Eve to Jupiter and Juno in Book 4 of *Paradise Lost*, and playing on the classical association of these figures with *aither* and *aer*, Milton upholds the interpretation of *aer* as mist/cloud. Adam is said to smile on Eve "as Jupiter / On Juno smiles, when he impregns the clouds / That shed May flowers" (4.499-501). In the context of this innocent image of Prelapsarian love, clouded air symbolizes fertility. But elsewhere in postlapsarian contexts, the ancient Greek understanding of air seems to haunt Milton's descriptions of atmosphere, presenting it as always already darkened, clouded, or full of *something*. That Milton's works typically denominate this presence as spiritually embodied evil is not surprising, since it was popular believed and affirmed by theologians that demons could affect the weather.

Because atmosphere—the medium of sound—was long associated with spirits and angels, but also subject to the experimentation of natural philosophy, the *topos* of acoustical representation throughout the seventeenth century foregrounds intersections of early modern folklore, Christian doctrine, and empiricism that are not commonly included in surveys of science and literature. "The Science of Sound in the Poetry of John Milton" thus draws attention to scientific discourses whose subjects—weather and sound—are directly implicated in the aesthetic production of the Renaissance.

In the first two chapters of this study, I explain how Milton adapts Aristotle's respiratory model of meteorological "exhalation" and Marsilio Ficino's astrological theory of music in *The Nativity Ode* (1629) and *Comus* (1634), two early works that express anxiety about the purity of earthly acoustics. These concepts from classical and occult traditions imply an acoustically animistic universe, which Milton invokes to

underscore the vital and sometimes threatening connection between voice and the atmosphere's spiritual agency.

Chapter 1, "'Infant Cries': Meteorological Voices in the Early Poems," explicates the role of classical meteorology in the young Milton's representation of the Incarnation. Christ's birth initiates the sanctification of earthly acoustics in *The Nativity Ode*, including the expulsion of corrupting influences from meteorological phenomena, which are presented as earth's primary vehicle of sound. As a consequence of this act of exorcism, the atmosphere becomes a fit instrument of divine poetry and a materialist alternative to the Platonic notion of inaudible sphere-music. Fundamental to Milton's representation of acoustics in *The Nativity Ode* and other early poems, the science of meteorology informs his thinking on sound throughout his career.

Chapter 2, "Early Acoustic Theory and the Aural Soul in *Comus*," argues that the heroine of Milton's masque evaluates contemporary models of sound transmission through her aural judgments. The masque presents the Lady's attempts to locate her brothers in a dark wood and her encounter with its local sorcerer as a trial of chastity. The preservation of the Lady's chaste soul depends on a series of choices. She must decide whether and when to listen, ignore sound, trust her ear, speak, sing, and yell. I argue that several theories on sound inform her decisions. Experiment, the methodology touted by acoustical pioneer Francis Bacon, helps the Lady to a degree, but has little purchase on the forest's magically altered atmosphere, which Milton depicts as muffling and acoustically distorting. By portraying sound as susceptible to magical interference and

capable of enlarging or depleting a person's spirits, Milton indicates that concepts from occult philosophy are indispensable for understanding acoustics.

Chapters 3 and 4, "The Power of the Air in Milton's Epic Poetry" and "Satanic Acoustics in *Paradise Lost*," turn to the interplay between spiritual and mechanical explanation in the acoustical descriptions of Milton's late masterpieces. In these works, Milton sets out to show that mechanism, which many felt was the sole cause of acoustical phenomena, is not antithetical to a spiritual mode of sound transmission. Both kinds of explanation are used in Milton's epics to suggest that sound, though morally indeterminate in itself, is a potentially corruptible and corrupting phenomenon. Milton's subscription to the orthodox doctrine that the Devil rules the air and influences the weather informs his depiction of the fallen angels in *Paradise Lost* as pneumatically empowered spirits who use and embody instruments to produce corrupt sounds.

Chapter 3 argues that Milton develops certain ancient and pervasive concepts of air in his epics to represent the atmosphere and its acoustics as spiritually charged. By foreshadowing Satan's dominion over the air in *Paradise Lost* and documenting its fulfillment in *Paradise Regained*, Milton centers his demonology on the satanic figure of Ephesians 2:2, "the prince of the power of the aire." This verse inspired centuries of exegesis on Satan's aerial power, and encouraged the widespread belief that demons execute God's judgments on earth by manipulating the weather. "The Power of the Air in Milton's Epic Poetry" explains how Milton's characterization of the devils adapts this nuanced tradition. His association of the fallen angels with clouds and suggestion that their substance became grosser upon sinning, for example, draws on Augustine's idea

that, as a penalty for their disobedience, the apostate angels were given bodies of air and cast into a misty layer of atmosphere. In addition to supplying an origin story for inclement weather, Milton's depiction of the fallen angels as meteorological powers explains the pneumatic tactics Satan uses to penetrate Eve's mind and enter the serpent while they sleep.

Inspiration is one method by which Satan produces pernicious acoustics and, ultimately, the serpent's speech. Chapter 4, "Satanic Acoustics in *Paradise Lost*," argues that he also relies on mechanism. This chapter proposes that Milton characterizes the devils as acoustical engineers and may have been drawing on the ideas of mechanists John Wilkins and Marin Mersenne. The latter's account of wind instruments in the *Harmonie Universelle* (1636-7) pertains to Milton's representation of the meteorologically powerful devils embodying, building, and operating acoustical engines, such as the great pipe organ of Hell and the thundering guns they use in heaven. In particular, Mersenne's distinctive description of the Renaissance instrument called the serpent—a long, 'S'-shaped horn—is strongly reminiscent of Milton's satanic snake. Milton's deliberate portrayal of Satan animating the serpent and, earlier, manipulating the "organs" of Eve's fancy as a musician would an instrument, testifies to his fundamental belief that sound involves the interaction of spirit and mechanism. Milton seems to warn readers that the potential for acoustical corruption is woven into natural and artificial environments. Machines, the wind, even people may be transformed into Satan's organs.

Chapter 1: "Infant Cries": Meteorological Voices in the Early Poems

I. "SCORN THE SORDID WORLD, AND UNTO HEAVEN ASPIRE"

Before visiting the Continent and writing his first tracts critiquing the English Church and government, Milton composed several poems with little apparent bearing on religious politics or civic affairs. Unpopular at Cambridge, self-excluded from the clergy, and passing several years in his parents' country homes in study, the young Milton cultivated few of the traditional ties to life in this world. Neither the political impulse "to defend and be useful to his friends," "the desire of house and family," nor any craving for "honor and repute," could induce him to take orders and disturb his commitment to study.[1] Rather he hearkened to sounds and voices from a higher plane and responded in kind with poetry that aspires to divine harmony and celebrates matters supramundane. Early works like *Ad Patrem*, *The Nativity Ode, Upon the Circumcision*, and the *Passion*, which were neither commissioned nor occasioned by a person's death, and thus give us a sense of Milton's own inventive tendencies at this time, are especially oriented toward

[1] A "Letter to a Friend" (1633); John Milton, *The Essential Prose of John Milton*, ed. William Kerrigan, John Rumrich, and Stephen M. Fallon (2013; repr., Modern Library, 2007), 9.

cosmic subjects.[2] Indeed, Milton confesses in *At a Vacation Exercise* that "if [he] were to choose," he would write poetry about the heavens, the air, and the beginning of time (29-52). In addition to surveying the distant regions where poetry transports the soul, these poems hold up the concept of the *musica mundana*, the unheard music of the spheres, as the ideal pattern for expression.

Milton considers the intellectual value of the *musica mundana* in one of his orations at Cambridge, *Prolusion II* ("On The Harmony of the Spheres"). Without placing too much weight on its position, which by the custom of such orations would have been pre-determined, we will look briefly at its conception of sound and hearing. The speech is not so much a defense of the harmony of the heavens, as its title suggests, but of a historical person, namely, the philosopher Pythagoras with whom the theory was supposed to originate. It focuses on preserving the image of Pythagoras the man rather than his theory, possibly because Milton felt that sphere-music was philosophically untenable, but also because Pythagoras exemplified the kind of intellectual heroism that galvanized Milton's poetry throughout his career. The oration begins by denying that Pythagoras believed the spheres *literally* make music, as Aristotle charges in *De Caelo*, proposing rather, that if he entertained any notion of celestial song, it was a metaphor for

[2] In treating the afterlives of the deceased, mourning poems such as *In Obitum Praesulis Eliensis* [On the Death of the Bishop of Ely] (1626), *Lycidas* (1637), and *An Epitaph on the Marchioness of Winchester* (1631), also refer to cosmic themes. But by reciting numerous classical precedents for the deaths, these poems stay grounded in ancient lore. Milton's Italian and English sonnets and some of the elegies are poems that were not commissioned yet privilege human affairs: erotic love, friendship, spring, society. However these worldly concerns, though central, typically do not overshadow the speaker's desire for spiritual transcendence (see especially Sonnet III and VI). My edition is *Milton: The Complete Shorter Poems*, ed. John Carey, 2nd rev. ed. (Harlow, Eng.: Longman, 2007). References to Milton's poems in this chapter are from Carey's edition, and henceforth will be cited parenthetically in the text by line number (unless the citation is a prose translation, in which case I will use the page number).

the spheres' lawful, continuous, and orderly motions.[3] It also, somewhat contradictorily, concedes the probability of the legend that Pythagoras was the only mortal ever to hear the celestial music, citing his worthiness "to hold converse with the gods themselves, whose like he was, and to partake of the fellowship of heaven" (CPW 1.238). The reason given for why others cannot hear the sound is that we lack souls like Pythagoras's, which was "pure, chaste, and white as snow" (CPW 1.239). If we only possessed this inner perfection "our ears would ring and be filled with that exquisite music of the stars" (CPW 1.239). This physiologically vivid account of how exceptionally pure souls perceive cosmic truths troubles the oration's initial assurance that sphere music is not real. The image of ears ringing out and filling up with music urges us to conceive of the divine conversation in aural terms. Given its insistence that Pythagoras indeed heard the heavenly concord and suggestion that cosmic insights are realized aurally, the oration opens up the possibility that sound exists as on a spectrum whose parts are variously perceptible to differently gifted hearers.

Often Milton's early poetry broadcasts cosmic and metaphysical "conversations," like the kind Pythagoras could participate in, and excludes unworthy or earthly voices. During his Cambridge days, Milton, as David Masson notes,

> was conscious of '*os magna soniturum*,' the mouth formed for great utterances, so all that he does utter has a certain character and form of magnitude. The stars, the

[3] Aristotle's criticism of Pythagoras, Milton points out, rests on the assumption that the doctrine of the music of the spheres is literal. My text for Milton's prose for the remainder of this chapter is the *Complete Prose Works of John Milton,* gen. ed. Don M. Wolfe, 8 vols. (New Haven: Yale University Press, 1953–82) and will be cited parenthetically as "CPW" with volume and page number. The reference here is to vol. 1, p. 236.

> gods, time, space, Jove, immortality, […]—what are they but the intellectual commonplaces of young Milton, the phrases which his voice most fondly rolls…?[4]

In *Ad Patrem*, an elegy written in thanks and supplication for his father's approval, Milton defends his chosen craft, "divine poetry," and looks forward to a time when he and his musically gifted father will wed "our sweet songs to the smooth-voiced strings, and the stars and the vaults of both the hemispheres will make their music in reply" (p. 159). Transcending its life on Earth, Milton's poetry is fated to unite with the divine music of heaven and speak to the universe itself.

A poet intent on singing to and about the "high Platonic sphere," as Masson puts it, must tune his soul to the heavenly *harmonia*. The notion that souls could resonate with sphere-music derives from the assumption in classical thought that macrocosmic and microcosmic orders were metaphysically connected. Macrobius's well-known commentary on Cicero's dream of Scipio, the *locus classicus* of the myth of the music of the spheres, proposes that earthly music can awaken a memory of the soul's celestial birthplace and the divine music it once knew.[5] That the soul came from a divine place and occasionally rekindles a connection with it is an ancient notion, embraced by the Neoplatonists and affirmed by the young Milton, as evidenced by *Prolusion VII* ("Learning brings more Blessings to Men than Ignorance") where he states "it is, I think, a belief familiar and generally accepted that the great Creator of the world, while

---

[4] *The Life of John Milton* (Cambridge: Macmillan and Co., 1859), 1:286.
[5] John Hollander, *The Untuning of the Sky: Ideas of Music in English Poetry, 1500-1700* (Princeton, New Jersey: Princeton University Press, 1961), 30.

constituting all else fleeting and perishable, infused into man, besides what was mortal, a certain divine spirit, a part of Himself, as it were, which is immortal, imperishable, and exempt from death and extinction."[6] While he would later reverse his views on the immortality of the soul, his early work was energized by the Platonic notion of a migratory soul, trapped by the body and awaiting eventual reconciliation with the divine.

Yet the super-sensitive, immortal soul that the young Milton wishes to revive in man with the harmonious sound of his poetry is not strictly immaterial, nor distinct from the natural world. The refinements *Prolusion II* claims are requisite for the soul's harmony with its heavenly source—purity, chastity, and likeness to snow—represent a more physical than mental kind of attunement. The significance of the soul's material condition in Milton's model of transcendent perception is absent from that of the Neoplatonists, who typically conceived of ecstasy or rapture as a function of dreaming or the imagination. In their view the astral "container" or vehicle that originally conveys the soul into the body flows out of it in divinatory dreams via man's *spiritus phantasticus,* or his imaginative faculties.[7] To be sure, Milton deems the imagination, as well as intellect and learning, as crucial to liberating the spirit from the body; but he also seems to regard the material quality of the soul as a precondition of its activation and perception of heavenly sound. His account of perceptual *harmonia* fuses together somewhat conflicting

---

[6] John Milton, *Prolusion VII*, trans. Phyllis B. Tillyard, in *Complete Prose Works of John Milton*, Wolfe, 288-306, 1:291. The notion that the soul possesses a migratory "container" may be traced to ancient hermetic beliefs, Stoic philosophy, and appears in the writings of Porphyry, Proclus, Macrobius, and others. See Robert Klein, "Spirito Peregrino," in *Form and Meaning: Essays on the Renaissance and Modern Art*, trans. by Madeline Jay and Leon Wieseltier (New York: Viking Press), 62, 65.

[7] Klein, "Spirito Peregrino," 62-72. The spirit was sometimes conceived of as aerial and igneous as well as astral or ethereal (p. 65).

strands of thought relating to, on the one hand, Platonic idealist cosmologies, and on the other, more materialist systems. Of the latter, Stoic physics is an apparent influence because its core concept of *pneuma* bridges the dualist division between body and soul.

A universally distributed substance that acts as the vital, organizing principle in all matter, *pneuma* is conceptually similar to the material soul-stuff that, by Milton's account, enabled Pythagoras to hear the celestial music.[8] The *pneuma* controlling each person's psyche, and thus all their physiological and perceptual functions, persists after the body dies (as the young Milton supposed of the soul). Unlike the immortal soul of Christianized Platonism, *pneuma* in Stoic philosophy is a corporeal substance similar to the divine ingredient in all organisms and inanimate things, and thus fundamental to cosmology as well as psychology.[9] Etymologically speaking, this vital element in Stoic thought, which connects the individual soul to that of the world, is identified with organic and earthly vapors. Outside of philosophy the noun *pneuma* simply denotes "breath" or "breeze" and derives from the verb "to blow."[10] In Milton's work, the mechanisms through which the well-tempered soul communicates with the divine are *pneuma*-like in the sense that they, too, are both oral and ecological. Pythagoras' soul rings with the celestial song partly because of its meteorological composition: it is "white as snow."

---

[8] A. A. Long, *Hellenistic Philosophy: Stoics, Epicureans, Sceptics*, 2nd ed. (Berkeley: University of California Press, 1986), 147-75.

[9] A. A. Long, "Stoic psychology" in *The Cambridge History of Hellenistic Philosophy*, ed. Keimpe Algra et al. (Cambridge: Cambridge University Press, 1999), 561. For the permeation of *pneuma* throughout the universe see David Furley's chapter on "Cosmology," also in *The Cambridge History of Hellenistic Philosophy*, pp. 440-41.

[10] Furley, "Cosmology," 440.

II. "THROUGH MIDDLE EMPIRE OF THE FREEZING AIR / HE WANDERED LONG"

In place of the mystical *pneuma*, Milton designates the atmosphere in its variety of forms—snow, cloud, vapor, thunder, lightning, etc.—as the conduit to transcendent vocal expression. Situated between the celestial orbs and the human realm, it plays a pivotal role in Milton's understanding of what we might call the great sonic chain of being. Air is the animate medium capacitating aural exchange between mundane and heavenly spheres. When not converted to an echo chamber for the divine music, as in Milton's early masterpiece *The Nativity Ode* (1629), the atmosphere and its various meteorological dispositions are often represented as conferring a privileged vocality on those who would speak worthily of the divine. I have already mentioned that in *At a Vacation Exercise*, written not long before *The Nativity Ode* and delivered at a college entertainment, Milton contemplates what he would say were he free to choose his theme. To communicate this "graver subject," he explains, would require "fit sound" (30, 32). The quest for sound worthy of his theme takes place in the middle part of the oration, where the speaker pursues his fancy into the far reaches of the cosmos. This brief excursion reveals what he might speak about if the choice were his and where he might find appropriate sounds. In the heights of heaven the speaker's actions are noiseless; all he can do is look at the blissful gods and listen to Apollo's music, possibly with the aim of emulating it. To speak, however, it seems he must descend

> through the spheres of watchful fire,
> And misty regions of wide air next under,

And hills of snow and lofts of piled thunder

(40-2)

Only after traversing these layers of atmosphere may he "tell at length" and "sing" the secrets of the world (43, 45). The mental trip the poet takes before speaking (the opening part of *At a Vacation Exercise* depicts a similar but more literal process of "clearing the throat") demonstrates that atmosphere is integral to both the physical act of speaking—supplying the wind in his lungs and allowing him to vocalize his divinely-inspired tune—as well as poetic invention. He may derive the pattern of his harmony from "above the wheeling poles," but to fashion and inspire his own song he needs the native element of air (34). The polysyndeton in the lines depicting the speaker's passage through the skies ("And misty regions…/ And hills…and lofts") suggests that by plummeting through the clouds he gains a kind of imaginative momentum.

While the air can give substance to the heavenly sounds that the soul perceives in its flights of fancy, as often as not in Milton's poetry, atmosphere poses an obstruction or hazard to the clear perception of divine sounds. Though it may be channeled to record and resonate the heavenly *harmonia,* atmosphere also captures and reflects Earth's discordant acoustics—sound that has been corrupted by sin. To remind readers that atmosphere, in its compromised and sinful state, is the basis of all earthly utterance, Milton emphasizes environmental voices in lieu of human ones in the early poetry. By underlining the environmental nature of vocality, indeed of all sound, Milton brings to light aspects of the act of speaking of especial concern to the poet, whose artistic medium is identical to air, an element which simultaneously partakes of divine and corrupt

sounds. The air poses both a pathway and stumbling block to the poet or intellectual hero, whose aim is to hear the divine music and make it intelligible to others.

Since all earthly voices stem from the atmosphere and through it some may converse with the divine, Milton defines certain avenues for correctly harnessing the vocal power of the air. To cast one's voice into the divine conversation, for example, one must possess deep knowledge of Creation. In *Prolusion VII,* Milton asserts "a man who is almost entirely absorbed and immersed in study finds it much easier to converse with gods than with men" (1:295). If too much study diminishes one's interpersonal skills, then its reward—especially that of learning that celebrates the intricacy of the universe—is a stronger voice for honoring God: "The great Artificer of this mighty fabric established it for His own glory. The more deeply we delve into the wondrous wisdom, the marvelous skill, and the astounding variety of its creation (which we cannot do without the aid of Learning), the greater grows the wonder and awe we feel for its Creator and the louder the praises we offer Him" (1:291-2). In one respect, education has a narrowing effect; it deepens the piety of the voice and focuses it on the divine. But it also is a liberator, freeing the soul from corporeality and transporting it to the outer spaces of the universe. After learning everything there is to know about the world, "the spirit of man, no longer confined within this dark prison-house, will reach out far and wide, till it fills the whole world and the space far beyond with the expansion of its divine greatness" (1:296). The human voice is upborne with the soul and invested with power over the forces of Nature. He who understands the natural world and can predict its vicissitudes "will indeed seem to be one whose rule and dominion the stars obey, to

whose command earth and sea hearken, and whom winds and tempests serve" (1:296). He speaks to these entities not through apostrophe, the mode usually applied to inanimate things, but dialogically with the expectation they will comprehend and obey him.

While Milton's juvenilia do not name the specific kinds of philosophy man should pursue in order to know and command Nature, they imply the importance of natural sciences in general. In the scenario depicted below from *Prolusion VII*, man's complete mastery of natural law depends on his combined knowledge of several branches of philosophy including astronomy, physics, and metaphysics:

> What a thing it is to grasp the nature of the whole firmament and its stars, all the movements and changes of the atmosphere, whether it strikes terror into ignorant minds by the majestic roll of thunder or by fiery comets, or whether it freezes into snow or hail, or whether again it falls softly and gently in showers of dew; then perfectly to understand the shifting winds and all the exhalations and vapours which earth and sea give forth; next to know the hidden virtues of plants and metals and understand the nature and the feelings, if that may be, of every living creature; next the delicate structure of the human body and the art of keeping it in health; and, to crown all, the divine might and power of the soul, and any knowledge we may have gained governing those beings which we call spirits and genii and daemons.
>
> (CPW 1.295-6)

Though this description privileges wisdom in matters of the soul, it also exalts knowledge about all aspects of the cosmos. Indeed, "universal learning" is presented as necessary for achieving intellectual rapture—the spirit's release from the "dark prison-house" of the body into the space beyond the world (CPW 1.296). Almost Lucretian in its rationalism, this educational program promises to dispel distressing uncertainty about the world. By dwelling on the variety and potentially frightening nature of meteorological activities, Milton implies that the vacillations of the atmosphere are a major source of this uncertainty. In comprehending the complexity of the weather, which "[strikes] terror into ignorant minds," we overcome our greatest fears of the unknown.

Milton's emphasis on meteorological phenomena in this passage possibly reflects the fact that a similar plan for "universal learning" appears at the beginning of Aristotle's *Meteorologica* and includes an extended account of the sublunary atmosphere and its changes. Though the curriculum Milton envisions in *Prolusions VII* covers a few topics that Aristotle's summary leaves out (namely, medicine and metaphysics), in large part it resembles Aristotle's rubric, which delineates, probably for the first time, the scope of natural philosophy and all its branches.[11] Aristotle, like Milton after him, follows a spatial organization in his précis of natural philosophy, beginning with the macrocosm and proceeding to the microcosm. Celestial subjects are treated first, atmospheric movement next, and the study of plants and animals last.[12] In *Ad Patrem,* Milton provides a similar

[11] Edward Grant, *A History of Natural Philosophy: From the Ancient World to the Nineteenth Century* (Cambridge: Cambridge Univ. Press, 2007), 42.

[12] Aristotle's sketch of the scope of his natural investigations in *Meteorologica* is ordered vertically, beginning with topics relating to the movement of the heavens, transformations of the terrestrial elements,

map of the divisions of science when he expresses gratitude for the chance to learn about all that exists "in the sky, or on mother earth beneath the sky, or in the air that streams between them, or hidden beneath the waves, beneath the heaving marbly surface of the ocean" (p. 160). What we call the atmosphere is neither vacuous nor uncomplicated in this description. Air constitutes its own middle region between the sky and the earth, and its phenomena warrant study in their own right.

Given that epistemology in these examples is conceived in spatial terms, with cosmography determining disciplinary boundaries, it is not surprising that Milton frequently emphasizes the environmental context of oral and sonic phenomena in his early poetry. Because natural objects are known in part by their location in the cosmic hierarchy, the place from which sound originates and through which it permeates is perhaps its most meaningful attribute. The *displacement* of sounds and voices is significant too, as in the opening lines from *The Passion*, which allude to *The Nativity Ode*'s depiction of heavenly music on Earth: "Erewhile of music, and ethereal mirth, / Where with the stage of air and earth did ring" (1-2). The theater conceit construes the songs of the angelic choirs, and indeed Milton's ode itself, as fantastic and fleeting; their tenure on Earth is as brief as that of a play. In *Ad Patrem* sonic environments can be revealing even if the sounds themselves are not audible. The only way of imagining the music of the afterlife, for instance, a "deathless melody, an indescribable song," is to contemplate the celestial place where the spirit will ascend (and where Milton claims

---

and moving downward to earth dwelling organisms. See *Meteorologica*, tr. H. D. P. Lee, Loeb Classical Library (Cambridge, MA: Harvard University Press, 1952), bk. I., ch.1, 5-7.

poetry has already carried his spirit) "round the hurtling spheres" and "among the starry choirs" (p. 159). As we shall see, in the *Nativity Ode* Milton refers to earthly voices metonymically by way of the atmosphere, and uses the hierarchy of cosmic space to indicate the inferiority of atmospheric voices to heavenly sounds, but also the potential for mutual exchange between human and divine realms.

Outside of his poetry, we do not have biographical evidence that Milton studied the atmosphere or was expert in meteorological theory. Nevertheless, this might well have been the case. At Cambridge he likely encountered Aristotle's theory of meteors, either directly or in a scholastic textbook like Bartholomaeus Keckermann's *Systema Systematum* (1613), which includes a section on meteoric phenomena and their causes.[13] Milton makes an explicit reference to the *Meteorologica* in *Prolusions II* where he alludes to Aristotle's discussion of "goats" or shooting stars (CPW 1.238).[14] After his university days, Milton probably continued to encounter meteorological writings in his independent studies. In 1631 he purchased a copy of Aratus's *Phaenomena* (Paris, 1559), a classical Greek poem whose latter part offers interpretations of weather signs found in astronomy and wildlife. Some of the annotations in this volume are from Milton's hand and thought to originate from two different periods in his life—directly after he bought

[13] Richard Holdsworth, a prominent Cambridge don in the early 1600s, taught Aristotle's *Meteorologica* to students in their fourth year, for example. Meteorology, however, was by no means a primary subject of study at Cambridge. The section on meteorology in Keckermann's *Systema* spans less than one hundred pages in the two-volume set, which is approximately three thousand pages long. For Holdsworth's pedagogy and an in-depth discussion of the seventeenth-century physics curriculum at Cambridge see William Costello, *The Scholastic Curriculum at Early Seventeenth-Century Cambridge* (Cambridge, Mass: Harvard University Press, 1958), 42, 83-102, 148-9.

[14] Meteoric phenomena known as "goats," torches, and shooting stars are discussed in Book 1, Chapter 4 of *Meteorologica.* See Aristotle, *Meteorologica*, 29-33.

the book and later, when he tutored his nephews.[15] Though most of the notes refer to grammatical issues, one passage that Milton marked pertains to weather prediction and seems to have inspired similar verses in *Paradise Lost.*[16] Since the *Phaenomena* is one of just a few extant volumes containing Milton's notes (many others must have existed), it does not tell us the extent to which he read meteorological lore. But its annotations prove that he had engaged closely with a literary text about weather signification, a tradition that influences his depiction of meteorological phenomena as communicating messages of a divine or spiritual origin.[17]

The curriculum Milton outlines in *Of Education* (1644) exposes pupils to the "history of meteors" after they have mastered Latin and Greek. Since Greek was necessary to advance to this subject, we may assume that Milton intended for students to learn meteorology from the classics, possibly in tandem with Renaissance compendiums of science. If the educational program this tract espouses resembles at all the kind of reading Milton himself undertook, either at Cambridge or his father's country home in Horton, where, as he states in *The Second Defense of the English People*, he devoted himself "entirely to the study of Greek and Latin writers," then it is probable that his knowledge of meteorology derives in large part from classic works of natural philosophy

---

[15] Maurice Kelley and Samuel D. Atkins define two periods that Milton annotated his copy of Aratus. The first occurred after he purchased the book in "1631-early 1638, perhaps ca. 1631-32," before his departure to Italy. The second period occurs after Milton's trip to Italy and most likely when he was tutoring his nephews: "1639-52, probably ca. 1641-42." See "Milton's Annotations of Aratus," *PMLA* 70 (Dec. 1955), 1096-1099.

[16] The lines in *Paradise Lost* that echo the passage Milton noted from Aratus are at 10.661-64. See Kelly and Atkins, "Milton's Annotations of Aratus," 1103.

[17] A classic in this tradition is Ptolemy's book on astrology *Tetrabiblos*, which reveals the art of weather forecasting based on the appearance of heavenly bodies. See Ptolemy, *Ptolemy's Tetrabiblos: Or, Quadripartite; Being Four Books of the Influence of the Stars*, trans. and ed. J.M. Ashmand (London: W. Foulsham & Co., 1917-1936).

(CPW 4.1.614). The major texts containing explanations of weather besides Aristotle's *Meteorologica* are Seneca's *Natural Questions*, Pliny the Elder's *Natural History*, and Lucretius's *On the Nature of Things*.

As I have argued, Milton considers natural philosophy as a means of gaining control over Nature and endowing the voice with authority verging on that of the divine. He views the science of meteorology as particularly efficacious in bestowing this kind of authority. That practical knowledge of meteoric phenomena may refine and empower the human voice perhaps seems nonsensical. But reasons for linking the weather with speech and sound—its clarity, audibility, or potency—may be found in the language of the meteorological tradition and in Milton's persistent identification of the voice with spaces above and beyond the domestic or mundane. The next section argues that Milton associates the Earth's aptitude for producing sounds—speech, noise, and music, for instance—with the atmosphere, its motions, and inhabitants rather than human activities, and ventures an explanation for why he emphasizes the environmental aspect of acoustics in his early poems. I submit that the meteorological tradition with its rich oral and acoustic vocabulary for theorizing natural processes underlies Milton's conception of the voice in *The Nativity Ode*.

III. "SO SWEETLY SUNG YOUR JOY THE CLOUDS ALONG"

In December 1629, Milton wrote to Charles Diodati about his latest project, a Christmas poem:

> I am writing a poem about the king who was born of heavenly seed, and who brought peace to men. I am writing about the blessed ages promised in Holy Scripture, about the infant cries of God, about the stabling under a poor roof of Him who dwells with his Father in the highest heavens, about the sky's giving birth to a new star, about the hosts who sang in the air, and about the pagan gods suddenly shattered in their own shrines.
>
> (p. 122)

This description of *On The Morning of Christ's Nativity* ("The Nativity Ode") is more remarkable for its emphasis on the setting than on the occasion being celebrated, enumerating all of the cosmic spaces that are implicated by Christ's birth: a low stable shelters a king who hails from the "highest heavens"; the sky boasts a new star; the air is filled with divine music; and the Earth's pagan haunts become disenchanted all at once. The summary's insistent dilation of the cosmic environment is reminiscent of the accounts *Prolusion VII* and *Ad Patrem* give of the natural sciences. This is not surprising. The dynamics of cosmography—the interrelation between the regions of heaven, air, and earth, the porousness of their boundaries, and the movement of beings between them—are central concerns of Milton's early prose and poetry.

As much as these dynamics serve to organize and hierarchize knowledge of the universe, illustrating the intricately connected design of creation, they also produce an expansive, impersonal perspective in poems like *The Nativity Ode*. Rather than dwell on the animals by the manger, the shepherds and the magi, or Mary and Joseph, Milton's ode marginalizes the characters traditionally at the center of the nativity story. As J. Martin

Evans has observed: "The entire scene, one could say without exaggeration, has been completely dehumanized."[18] Where depictions of the human community that received Christ might emphasize his humanity, the poem's attentiveness to how the environment responds to and receives inhabitants from the higher spheres—stresses the relationship between Heaven and Earth and brings out the savior's qualities as a ruler: he comes to Earth to triumph over man's enemies and assume his role as man's awful judge.

In *The Nativity Ode* the arrival of the Lord and his heavenly train, and the Earth's reaction to their arrival, are registered with alternating representations of sound and silence. When Milton claims to Diodati that he writes about the "infant cries of God"—echoing the description in *At a Vacation Exercise* of his own babbling "infant lips"—he suggests that the ode will not depict Christ's birth as a wholly quiet affair (4). Yet in its fully realized form, the poem never represents the child's voice. Far more concerned with anonymous, environmental, or disembodied sound than with the voices of individuals, it relies on an assortment of non-human sounds as well as intervals of silence to announce the baby Jesus' presence. That the process of sonic renewal the Earth undergoes in *The Nativity Ode* lies behind the infant's "cries" cited in Milton's letter to Diodati illustrates that his definition of voice at this time centered on the expressiveness of the environment and the forces that move and shape it.

Milton's references (above) to the angels' song and the downfall of the pagan religions indicate two of the major kinds of sounds that herald the savior's birth in the poem: divine music and the lamentations of banished pagan gods. Each lies at opposite

[18] *The Miltonic Moment* (Lexington, KY: The University Press of Kentucky, 1998), 15-16.

ends of the sonic chain of being, with divine harmony at the top and the voices of devils and false oracles at the base. In between these zones stretches the morally ambiguous acoustic space of the atmosphere, which, when moved by music or poetry can be made to sympathize with the heavenly *harmonia*, but is also easily contaminated or manipulated by corrupt forces. Accordingly, *The Nativity Ode* represents the air as an undecided space, a region courted by earthly and ethereal agents and almost conquered at the Nativity by the irresistible presence of God. Though the poem looks forward to and imagines a future time when the air might be converted to making perfect sounds, Milton cannot depict it as already conquered and subsumed into Heaven at the Incarnation. Instead he portrays the air as a pliable and yielding substance that strains to obey the articulations of Nature—its laws and directives—while preferring the sweet music of Heaven. Milton stages the birth of Christ as an acoustical contest over the air possibly because he sees the Incarnation as enacting the first phase of a kind of sanctification of the universal voice. At the moment of Christ's birth, when the Word came into the world, it did not simply speak to a few; it seized the entire atmosphere so that it might express itself through Nature and eliminate false influences from every voice. But the sanctification is not entire, and Milton assures us that some evil remains in the air.

Milton would also have had personal reasons for placing the atmosphere at the center of his poem. He wrote the ode around the time when he was deciding on a vocation, and it is possible that a driving motivation behind it was to better understand the moral status of the air, which would serve as the material of his poetic craft. The capacity of the air for joining in or supporting divine music, which Milton viewed as a

poetic ideal, would certainly concern an earnest young poet, anxious to use his talents in the service of God. And it is this question that *The Nativity Ode* explores by imagining the kinds of sounds the air might produce or withhold in the presence of Heaven's king.

After a brief proem addressed to the Heavenly Muse, the section of the ode entitled "Hymn" begins by describing the conditions in which Christ was born in "the winter wild" (29). The harsh season is attributed to Nature's anxiousness to appear chaste and sober to the Lord:

> Nature in awe to him
> Had doffed her gaudy trim,
> With her great master so to sympathize:
> It was no season then for her
> To wanton with the sun her lusty paramour
>
> (32-6)

The next stanza continues the conceit that Nature is a coquette currently on her best behavior, and even goes so far as to imply that her sexual promiscuity has left her body diseased and scarred. To hide her "foul deformities" from God and paint herself a virginal hue, she covers herself with a white "saintly veil" of snow (42-4). But Nature, whose "front" or body is associated with the Earth itself, is not capable of furnishing this snowy disguise on her own. She needs the air's cooperation:

> Only with speeches fair
> She woos the gentle air

To hide her guilty front with innocent snow.

(37-9)

The conceit makes the air seem both independent from Nature, but also under her power, which lies in her ability to persuade or "woo" the air with speech. The details of this interaction are somewhat enigmatic. Why does Nature use speech (a distinctly human invention) and not some other means to coax snow from the sky? What do her fair speeches consist of, or what do they signify apart from flattery? The previous stanza tells us that in warmer seasons, Nature would "wanton with the sun," implying that its warmth could be won by Nature's physical or visual appeal. But the atmosphere evidently responds to a different kind of overture, one that is elementally similar to it. It is because speech is made of air that the atmosphere *listens* to Nature's words. There is also the suggestion that Nature's verbal or vocal dalliance with the sky will be less offensive to the incarnate Lord than overt spectacle. (The qualifying word "only" in the statement that Nature "*only* with speeches fair / …woos the gentle air" [my italics], casts her speech as a lesser evil than the "gaudy trim" she flaunts in more temperate seasons).

There are additional reasons why Milton might characterize the falling of snow as a response to Nature's spoken commands, and, moreover, why he would devote two stanzas to explaining how this historic winter came about. One very probable explanation for Milton's portrayal of Nature as speaking to the air and telling it to snow is that from classical times most meteorological phenomena, including snow, were attributed to exhalations—vapors, believed to originate from the ground and its bodies of water, which some writers described as the Earth's breath. Exhalations became fundamental to

meteorological theory because of their prominence in Aristotle's *Meteorologica*, where they are invoked to explain nearly every kind of weather occurrence.[19] Exhalation theory enlarges on more primitive meteorological ideas, like those of the Pre-Socratic philosophers Anaximander and Anaximenes, whose views mostly survive in the works of other classical writers. Anaximander seems to have believed that *pneuma* shaped all meteorological activity, and for Anaximenes, who was said to be Anaximander's student, *aēr* is the primary element behind the weather.[20] Accounts of Anaximenes's philosophy indicate that he believed *aēr* is the basis not only of meteorological phenomena, but also all other forms of matter, for example, fire, wind, earth, and stone.[21] By attributing meteoric and other natural activities to transformations of *aēr* or *pneuma*—both ambiguously translated terms with a wide semantic range—some accounts of these Milesians' views suggest that they believed the world is animated by a universal breath or something like an individual soul.[22] Aristotle's concept of exhalations has a narrower, more technical definition than that pertaining to Anaximander and Anaximenes's weather-causing gases. He describes two types of exhalation—one arid and hot; the other, moist and cold—that in combination constitute the air.[23] In addition to acting jointly to

---

[19] Aristotle explains the origins of exhalations, which he divides into two kinds (hot-dry exhalation and cold-moist vapor) in Book I, chap. iv. In that chapter he demonstrates that hot exhalation is the material cause of shooting stars. It is also said to play a role in forming certain kinds of comets (see Book I., chap. vii). Vapors from the Earth cause cloud, mist, drizzle, and rain (see Book I, chap. ix). Snow is simply a derivation of cloud (Book I, chaps. x-xi). See note 12 for edition of *Meteorologica*.

[20] Liba Taub, *Ancient Meteorology* (London: Routledge, 2003), 74-5.

[21] Anaximenes's views about *aēr* are passed down through Aristotle, Aëtius, and Theophrastus (quoted in Simplicius). See Taub, *Ancient Meteorology*, 75.

[22] See Taub's analysis of *pneuma* in Anaximander's meteorology, and also Aëtius's gloss on Anaximenes's analogy between the breath of the body and the wind of the world, quoted in *Ancient Meteorology*, 74-5.

[23] According to Aristotle, air is "made up of these two components, vapor which is moist and cold…and smoke which it hot and dry"; see *Meteorologica*, p. 167, 2.4.360a21-6.

cause weather phenomena, each exhalation can produce its own distinct meteorological effects.[24] Although Aristotle does not claim that exhalations are the Earth's respirations, or, by the same token, that the Earth is alive, he sometimes employs biological metaphors to explain the movement of exhalation throughout the universe.[25] The very language of exhalation theory as deployed by Aristotle implies the organism-like structure of the Earth. The Greek word for exhalation, ἀναθυμίασις, hence applies both to geological activity and to rising vapors in bodily processes and in the soul. While descriptions of exhalations in the *Meteorologica* thus substantiate a physical theory of the sublunary world rather than a theistic or vitalistic one, they nonetheless suggest that processes of evaporation are similar to respiration and even digestion.[26] Seneca's definition of wind refers to the Earth as emitting breath: "Sometimes the earth itself ejects a great quantity of air, which she breathes out [*spirat*] from hidden recesses."[27] The Latin words that early modern commentators used to render Aristotle's exhalations, *exhalatio*, *spiratio*, and *halitus*, all stress their relationship to respiration.[28]

---

[24] At 2.4.360a21-35 and 2.4.360b1-26 Aristotle discusses the seasonal effects produced over time by the predominance of one exhalation in a region. There are many other places where Aristotle attributes meteorological phenomena to a single exhalation. For instance, at 1.4.341b25-35 he discusses the origins of meteors in the upper atmosphere, which occur because the windy or hot exhalation in that area is inflamed by the movement of celestial bodies.

[25] At 2.4.360b.24-6, for example, Aristotle suggests that dry and moist exhalations can predominate in neighboring regions of the sky much like different parts of the stomach can be variously moist and dry. Another biological analogy occurs at 2.8.366b14–19 where Aristotle argues that earthquakes are like the tremors our bodies experience from wind trapped within them. See *Meteorologica*, pp. 169, 209.

[26] For the Aristotelian notion that hot exhalations within the earth mimic the digestive function of the stomach, see Taub, *Ancient Meteorology*, 99-100.

[27] Lucius Annaeus Seneca, *Naturales Quaestiones*, trans. Thomas H. Corcoran, vol. 2 in *Seneca in Ten Volumes* (Cambridge, MA: Harvard University Press, 1972), 5.4.4, p. 81.

[28] For example, Liberti Froidmondi uses the term "halitus" for exhalations: "Aristoteles, & vniuersi omnes post eum, except vno Paracelso, materiam omnium meteororum in duobus halitibus constituit; in vapore, calido & humido, qui Grecé ἀτμίς, & exhalatione, calidâ & siccâ, quæ ἀναθυμίασις" (Liberti Froidmondi,

The *Meteorologica* only touches on the phenomenon of snow once and briefly. The main explanation Aristotle offers for it is, that "when cloud freezes snow is produced, when vapour, hoar frost."[29] He is more concerned with explaining the processes of evaporation and cloud formation, which occur continuously and account for all kinds of precipitation, including snow. According to Aristotle, clouds form when the sun draws up vapor from the Earth and the heat dissipates, causing the vapor to condense into water: "The exhalation from water is vapor; the formation of water from air produces cloud."[30] Refrigeration dispels more heat from the cloud, causing it to produce snow.[31] Thus, it is the combination of moist exhalation and intense cold that brings about snow. Both factors are potentially present in Milton's depiction of winter at the beginning of *The Nativity Ode*. Nature's abstention from "wanton[ing] with the sun" possibly alludes to the remote position of the sun in the winter sky. In Aristotle, evaporation and water formation in the air depend on the sun's position in the ecliptic.[32] The nearer the sun is to the "stream of vapor" that surrounds the Earth, the more moisture in the air rises; when the sun is farther from the vapor (as in the winter months) the more it cools and falls to

---

Meteorologicorum Libri Sex [London: Ed. Story, 1656], p. 148; EEBO Wing [2d edn.] F2235). Another seventeenth-century textbook writer, Eustachius a Sancto Paulo, substitutes the word "spiratio" for dry exhalation: "Bene scribit Aristoteles 1. Meteor. 13. materiam ventorum esse spirationem siccam & calidam seu exhalationem" (Eustachius a Sancto Paulo, *Tertia Pars Summa Philosophiae, Quae est Physica*, vol. 2 of *Summa Philosophiae Quadripartite de Rebus Dialecticis, Moralibus, Physicis et Metaphysicis*, 2 vols. [Paris: Carolym Chastellain, 1609], p. 244). Eustachius's work was reprinted at least nine times between 1609 and 1628 (Frederick P. Van De Pitte, "Some of Descartes' Debts to Eustachius a Sancto Paulo," *The Monist* 71, 4 [October 1988]: 487-97, 494n1). The word "exhalatio" is used ubiquitously in meteorological literature.

[29] *Meteorologica*, 77.

[30] Ibid., 70-1.

[31] Ibid., 77.

[32] "The efficient, controlling and first cause [of precipitation] is the circle of the sun's revolution. For it is evident that as it approaches or recedes the sun produces dissolution and composition and is thus the cause of generation and destruction," *Meteorologica*, 69.

the Earth.[33] The sun's estrangement from Nature in the first stanza of Milton's poem indicates that the atmosphere is cold and ready to produce snow. By the same token, Nature's "speeches fair" are akin to the moist exhalations or vapors that are the material cause of clouds and snow. In the *Natural History*'s section on meteorological causes, Pliny's description of the formation resulting from rising exhalation in the air mirrors the process whereby snow veils the Earth in Milton's poem: "as to the sudden blasts, which arise as has been said from exhalations of the earth, and fall back again to the earth *drawing over it an envelope of cloud*; these occur in a variety of forms" (italics added).[34]

Though Nature at first succeeds in coaxing the air to snow, her power over the air is suspended for the remainder of the poem. Christ's power over the elements, particularly manifest in the attraction of heavenly song, supersedes Nature's ability to command the air to be meteorologically productive. Both Nature and the representatives of Heaven conquer the air either by compelling it to participate in acoustical acts or altering the sounds it makes. We have seen that the meteorological activity at the beginning of *The Nativity Ode* is figured orally as it often is in classical natural philosophy. Nature's weather-causing exhalations are portrayed as speeches and the snow as the air's obedient response. With Christ's coming, however, the animating principles or law of Nature, which are manifested in the poem by its "speech," no longer hold sway

---

[33] "The cycle of changes reflects the sun's annual movement: for the moisture rises and falls as the sun moves in the ecliptic. One should think of it as a river with a circular course, which rises and falls and is composed of a mixture of water and air. For when the sun is near the stream of vapor rises, when it recedes it falls again," *Meteorologica*, 71.

[34] Pliny the Elder, *Natural History*, trans. H. Rackham, vol. 1 (Cambridge, MA: Harvard University Press, 1938), II.49.131-133, p. 271.

over the cosmic landscape. God's speech is required to move the starry sphere, which neglects the natural law that governs its motion because of its awe for Jesus:

> The stars with deep amaze
> Stand fixed in steadfast gaze
> …….
> Until their Lord himself bespake, and bid them go.
>
> (69-76)

God's agents, the "meek-eyed Peace" (46) and the "helmed cherubim / And sworded seraphim" (112-3), extend this divine authority into the sublunary realm, establishing their rule by quelling discordant sounds and replacing them with exquisite, heavenly music.

The acoustical method that the divine agents use to subdue and convert the Earth has a particularly powerful effect on the atmosphere. Milton repeatedly describes the air and its phenomena as being enamored with the heavenly host. This love or infatuation with the divine presence manifests itself in two different ways. At first the air falls into a state of silent captivation, and later, is moved to harmonize with the divine music. When God sends Peace into the world, she comes "crowned with olive green" and

> softly sliding
> Down through the turning sphere
> ……
> With turtle wing the amorous clouds dividing.
>
> (47-50)

The clouds are “amorous” towards her; she moves through them as a queen through crowds of admiring subjects. Once the “reign of peace” is established, “no war, or battle’s sound / Was heard the world around,” and a hush comes over nature:

> The winds with wonder whist,
> Smoothly the waters kissed,
> Whispering new joys to the mild ocean.
>
> (53-4, 63, 64-6)

The taming of Nature and subsidence of dissonant war mark the first stage in the world’s sonic renewal. Only in the absence of such noise may the air express the refined sounds of Heaven. After this lull comes over the land and the heavenly host breaks into song, the air’s silent admiration thus turns to ecstasy. Their music sends the shepherds’ souls into rapture, and “the air such pleasure loth to lose, / With thousand echoes still prolongs each heavenly close” (98-100). In contrast to the earlier passage where the air is wooed by Nature’s speech and consequently produces snow, here it is courted by a “divinely-warbled voice,” and responds by making echoes (96). These responses differ in purpose as well as in kind. Where the snow at the beginning of the poem is meant to mitigate Nature's shame by covering her up, these echoes make the divine music more audible and permanent. Not content to be a mere passive medium, the atmosphere participates in reproducing and preserving the sound of the angels’ otherworldly music. The air’s desire to luxuriate in and extend the angels’ song, along with the fact that the stars refuse to revolve except at God’s command, indicate that the environment is more strongly compelled by divine voices and sounds than by natural ones.

When she hears the rapturous sound of the angels' music, Nature herself concludes that the world, chiefly the air, prefers the melody of Heaven to her own spoken commandments:

> Nature that heard such sound
> Beneath the hollow round
> Of Cynthia's seat, the airy region thrilling,
> Now was almost won
> To think her part was done,
> And that her reign had here its last fulfilling:
> She knew such harmony alone
> Could hold all heaven and earth in happier union.
>
> (101-8)

Nature, the wooer, is herself "almost won"; in other words, she is almost convinced that her power over the physical world has been discontinued and replaced by a ruler capable of offering what she cannot: bliss and unity for all of creation. Nature's defeat is evinced by the fact that Heaven's superior harmony now possesses the "airy region" where Nature's speeches formerly held sway.

The stanza elaborates one of the *Nativity Ode*'s major conceits by presenting Heaven and Nature (or Earth) as rival monarchs jockeying for sovereignty over the air. It foreshadows, for instance, the images of conquest in stanza seventeen that look forward to the Second Coming when "the dreadful judge *in middle air* shall spread his throne" (164; italics added). The latter stanza more fully realizes the eschatology hinted at in

stanza ten, depicting Heaven's actual annexation of the air as well as the real overthrow of Nature at the end of time. Though she judges prematurely in stanza ten that "her part was done," Nature's intuition that the apocalypse will be heard as much as seen or felt is apt. Like the Nativity, the Last Judgment is presented as sonic event that takes effect in the atmosphere and underground (where meteorologists believed winds and exhalations were also present).[35] Hence the admonishment given by "wisest fate" that the world will not be truly redeemed until the "trump of doom" sounds

> With such a horrid clang
> As on Mount Sinai rang
> While the red fire, and smould'ring clouds out
> brake:
> The aged earth aghast
> With terror of that blast,
> Shall from the surface to the centre shake.
>
> (156-62)

According to this description, the world will be destabilized rather than unified by the sound of the apocalypse, which summons clouds and fire to the sky and undermines the foundations of the Earth. Before the harmony of divine music may join together Heaven and Earth eternally, the voice of Nature—its vital exhalations—must be blasted from the deep crevices of the Earth. Alluding typologically to the music of the Nativity, and before

[35] See Seneca's definition of wind quoted above. See also Aristotle's explanation of earthquakes, which he attributes to the generation of wind inside the Earth; *Meteorologica*, p. 205, 2.8.365b21-30.

that, the trumpet announcing God's deliverance of the Law on quaking, over-clouded Mount Sinai, this passage represents the Lord's final triumph over the air and the complete conversion of the atmosphere into an instrument of Heaven. Clouds appear not because Nature calls for them—she has no power in "the world's last session"—but because they manifest God's might (163).

The notion of the atmosphere as a zone of contention between forces from above and below was a familiar one from Pliny's *Natural History*, which contains sections on meteorological causes and weather prediction. Pliny's vivid description of the terrestrial atmosphere portrays the air as continually compressed and pulled on from opposite directions, and as a consequence, swept over with the meteorological phenomena generated by these motions:

> The force of the stars presses down terrestrial objects that strive to move towards the sky, and also draws to itself things that lack spontaneous levitation. Rain falls, clouds rise, rivers dry up, hailstorms sweep down; rays scorch, and impinging from every side on the earth in the middle of the world, then are broken and recoil and carry with them the moisture they have drunk up….Empty winds sweep down, and then go back again with their plunder. So many living creatures draw their breath from the upper air; but the air strives in the opposite direction, and the earth pours back breath to the sky as if to a vacuum. Thus as nature swings to and fro like a kind of sling, discord is kindled by the velocity of the world's motion. Nor is the battle allowed to stand still, but is continually carried up and whirled round, displaying in an immense globe that encircles the world the causes of

things, continually overspreading another and another heaven interwoven with the clouds.[36]

While a dizzying number of astronomical and meteorological forces are mentioned in this passage, only a few main causes are at play: the downward and upward pull of the celestial bodies, the Earth's outward and inward breaths or exhalations, and the circular motion of the heavens. The first two causes are reciprocal, accounting for the "to and fro" of vapors, winds, and precipitation between the Earth and sky.[37] The latter cause, the horizontal sweeping motion due to the continuous revolution of the celestial orbs, infuses "discord" into the "battle" that Pliny stages between the heavens and the Earth. Descriptions of marauding winds and sunbeams impinging on or striking against (*impellunt*) the Earth reinforce the idea that the land has a sometimes-hostile relationship with the regions overhead.

Pliny also discusses the push-and-pull of the stars alluded to in the passage above elsewhere in the *Natural History*. He seems to think of the world as held together by the stratification of elements that have naturally opposed weights: "Thus the mutual embrace of the unlike results in an intertlacing [sic.], the light substances being prevented by the heavy ones from flying up, while on the contrary the heavy substances are held from crashing down by the upward tendency of the light ones."[38] The planets therefore are

---

[36] Pliny, *Natural History*, II.48.102-104, p. 247.
[37] In the *Timaeus*, Plato states that the circular motion of the All compresses the elements into each other, accounting for their mutual transformations. Likewise, Pliny seems to think that the outer spheres of the world exert a pressure on the matter below, but he also adds that some matter strives upward. See *Timaeus*, trans. R. G. Bury, in *Plato in Twelve Volumes*, vol. 9 (1929; reprint, Cambridge, MA: Harvard Univ. Press, 1989), 58, A-B, p. 143.
[38] Ibid., III.3, 9-iv. 12, p. 177.

"upheld by the same vapor [air] between earth and heaven."[39] Though they are buoyed up by the air, the stars nevertheless cast down various kinds of meteorological phenomena into the atmosphere: "Some [stars] are productive of moisture dissolved into liquid, others of moisture hardened into frost or coagulated into snow or frozen into hail, others of a blast of air, others of warmth or heat, others of dew, others of cold."[40] For Pliny the stars and planets supply the "regular" causes of meteorological turbulence as opposed to the Earth's upward-tending vapors, whose atmospheric effects are merely "accidental."[41] Thunderbolts, for instance, have various causes, some of them regular and some accidental. They can also arise from a mixed cause, the product of a kind of battle between the terrestrial exhalation and the downward-tending pressure of the stars: "It is also possible for breath emerging from the earth, when pressed down by the counter-impact of the stars, to be checked by a cloud and so cause thunder, nature choking down the sound while the struggle goes on but the crash sounding when the breath burst out, as when a skin is stretched by being blown into."[42] The thrust of the heavenly bodies causes Nature to choke down the sound of its breath, leading eventually to an acoustically dramatic explosion. Pliny is in agreement with Lucretius who also believes that storm clouds result from the ether's repulse of rising terrestrial vapors: "From all rivers and also from the earth itself we see clouds and steam arising, which exhaled from these sources

---

[39] Ibid.

[40] Pliny, *Natural History*, II.28.104-xxxix. 106, p. 249.

[41] Pliny at first mentions this distinction when discussing the origin of rain and other precipitation. In a subsequent explanation of thunderbolts he states that their fixed cause is the influence of the stars, and when storms arise from the motions of these heavenly bodies they portend future events. Thunder and lightning that arise from exhalations, on the other hand, are a matter of chance and therefore have no prophetic value. See *Natural History*, II.28.104-xxxix. 106, 43.112-xliv. 114, pp. 249, 255.

[42] Ibid., II.43.112-xliv. 114, p. 255.

like breath are carried up in this way, and suffuse the sky with their blackness and bring up supplies to the clouds on high as little by little they come together; for the heat also of the starry ether presses on them from above, and by packing them close seems to weave a texture of cloud beneath the blue."[43] That Milton had absorbed the fundamentals of these models at least by the time he wrote *Paradise Lost* is apparent from the way the devils envision a possible second war with Heaven. Moloch, one of the advocates of open war in the infernal debates, compares his fellow spirits with elements that have a natural upward tendency, reasoning that while "descent and fall" is against the devils' nature, it is "in our proper motion [to] ascend."[44] Moloch also holds, like the meteorologists, that thunder will occur when the devils, like rising vapors meet with the downward pressure of the sky: "[The Almighty] shall hear / Infernal thunder" in Heaven.[45]

Yet the contest for the air depicted in *The Nativity Ode* differs somewhat from the battle endlessly waged in Pliny's atmosphere by the motions of the terrestrial and celestial realms. At the birth of Christ, Heaven's agents charm the atmosphere without using any violence. Peace is sent into the world to calm Nature's fears, and though she "strikes" the Earth with her wand, its blow sends out a universal peace, not discord (51-2). Similarly, God's presence in the world quiets Earth's winds, which act thereafter as agents of unity rather than disunity between Nature's regions:

The wind with wonder whist,

---

[43] Lucretius, *De Rerum Natura*, trans. W. H. D. Rouse, 2nd ed. (Cambridge: Cambridge Univ. Press, 1982), 6.468-494, p. 529.
[44] John Milton, *Paradise Lost*, ed. Alistair Fowler, 2nd edition (Harlow, England: Longman, 1998), p.113, 2.75-6.
[45] Ibid., p. 113, 2.65-6.

Smoothly the water kissed,

Whispering new joys to the mild ocean.

(65-7)

Far from stirring up turbulence in the atmosphere, the stars focus their "precious influence" (instead of more harmful emissions) exclusively on the newborn Lord (71). All of these signs indicate that Heaven's encroachment on the atmosphere at the Nativity is welcome. Even so, the political language of the conceit, combined with the fact that Nature expresses fears about a possible ouster, inevitably call to mind invasions of a more forceful nature. The ode's allusion to the thundering sound of the Last Judgment that will rock the Earth to its very core, moreover, testifies that God's reign in the sky will not always be peaceful. At an uncertain future date Heaven will harness the air to inflict a terrible punishment on the Earth.

The poem integrates the Plinian model of the atmosphere as a warzone by depicting Nature's "front" (Earth) and Heaven's agents as rivals in a contest over the air. As in Pliny's scheme, the Earth's rising breaths have acoustical and meteorological potency, commanding snow to fall from the air with "speeches fair." Their power to affect the atmosphere's sounds and its weather is offset by forces from above that God endows with even greater influence over the air. This scenario mirrors the stars' counteraction of the Earth's exhalations in Pliny's *Natural History*. The celestial bodies'

meteorological efficacy seems vaster than the Earth's, perhaps because the influence of the stars is not purely accidental, but "prophetical and sent from on high."[46]

IV. "TO HIS CELESTIAL CONSORT US UNITE"

Nature's awareness upon hearing the divine sound of the angelic choir that "such harmony alone / Could hold all heaven and earth in happier union" (107-8), offers further insight into Milton's views about the cosmic role of the sound. Her knowledge implies that before the Incarnation (nearly) ushers in a Golden Age with its miraculous harmonies, the unity of the world was in her charge. By reminding us that the healing concord of the spheres cannot join Heaven to Earth until Christ "redeem[s] our loss," the ode also suggests that Nature will resume her station as a unifier *after* the Nativity and until the Second Coming, perhaps in a modified capacity (125-56). How does Nature play her "part" in the great cosmic song? By now it should be clear that Milton conceived of her shaping influence on the atmosphere, at least, in terms of a universal voice. We know from *At a Solemn Music* that Milton attributed Orphic power to music that melds words with melody, and in *Ad Patrem* he implies that the two (words and music) are more powerful when mixed than they are singly.[47] Although Milton mainly criticizes textless music, not unsung speech, it is evident nonetheless that the spoken instructions Nature

[46] Pliny, *Natural History*, II.43.112-xliv. 114, p. 255.
[47] See *Ad Patrem*, ll. 50-55, and Milton

gives to the elements in the *Nativity Ode* are inferior to the music of the angel choir, which achieves the perfect union of divine voice and instrument. The implication is that Nature's aural expressions have a less powerful effect on the world than the rapturous sound of the Nativity, which represents the initial phase of a Providential plan to renew and replace the sound that binds the universe together.

The idea that music possesses a kind of cosmic binding power was not new. The notion has its roots in the Greek concept of *harmonia*, which could refer to the order in the cosmos as well as the proportions found in musical harmonies or scales.[48] Based on the Pythagoreans' discovery that the most mathematically "perfect" ratios correspond to pleasing sounding intervals in Greek musical scales, they presumed that these numbers also govern the structure and motions of the entire cosmos. Along these lines Western thinkers up through the Renaissance, notably Plato and Boethius, used musical metaphors to explain the harmonious motions of the spheres and the metaphysical relation between the heavens, the elements, man, and even aspects of civilization.[49] Related to the idea of world harmony is the tradition, rooted in the classical philosophy of nature and Hermetic writings, and revitalized by medieval and Renaissance occult philosophers, that the breath of the world—*pneuma* or spirit—exhales itself in the form of music.[50] Underlying this link between spirit and music is the Pythagorean myth of the spheres and its afterlife in Western philosophy: "World spirit, because it is the breath of a musically proportioned universe, is musical. Conversely, music, because it images cosmic music, possesses or is

---

[48] Hollander, *The Untuning of the Sky*, 26-27.
[49] Ibid., 24-25, 28-29.
[50] See Gretchen Ludke Finney, *Musical Backgrounds for English Literature: 1580-1650* (New Brunswick, NJ: Rutgers University Press, 1962), 102-125.

spirit."[51] It was primarily the philosophy of Marsilio Ficino that cemented this relationship by positing that the universe is alive, infused with spirit similar to music, and further, that its parts might be accessed and drawn into each other through song.[52] Earlier formulations gave *pneuma* or world spirit another defining attribute, similar to the meta-musical concept of *harmonia*, but more general. For the Stoics, *pneuma* has a kind of holding power that gives unified objects their natural shape by drawing to the center all of their parts: "As the active ingredient in all things in the world, *pneuma* is responsible for the 'tension' that holds all the world and everything in it together."[53] The metaphor of world music or harmony, then, accommodated not only the breath-like aspect of *pneuma*, but also its role as the glue that actively holds the universe together.

Milton uses this metaphor to express the divine music's capacity, like that of *pneuma*, to bring together or heal the distance between Heaven and Earth and simultaneously imprison any forces of opposition within its circumference. "For if such holy song / Enwrap our fancy long," the speaker muses, the Golden Age will come again

---

[51] Finney, *Musical Backgrounds*, 106.

[52] "Profecto mundanam corpus, quantum ex motu generationeque apparet, est ubique vivem, quod Indorum philosophi probant ex eo quod passim ex se viventia generet" ("Assuredly, the world's body is living in every part, as is evident from motion and generation."); "Quondo coelestia imitator, hinc quidem spiritum nostrum ad coelestem influxum, inde vero influxum ad spiritum mirifice provocat. Iam vero material ipsa concentus purior est admodum coeloque similior quam medicinae. Est enim aer et hic quidem calens sive tepens, spirans adhuc et quodammodo vivens, suis quisbusdam articulis artubusque compositus sicut animal, nec solum motum ferens affectumque praeferens, verum etiam significatum afferens quasi mentem, ut animal quodam aerium et rationale quodammodo dici possit" ("…When it [music] imitates the celestials, it also wonderfully arouses our spirit upwards to the celestial influence and the celestial influence downwards to our spirit. Now the very matter of song, indeed is altogether purer and more similar to the heavens than is the matter of medicine. For this too is air, hot or warm, still breathing and somehow living; like an animal, it is composed of certain parts and limbs of its own and not only possesses motion and displays passion but even carries meaning like a mind, so that it can be said to be a kind of airy and rational animal."); see Marsilio Ficino, *Three Books on Life*, trans. Carol V. Kaske and John R. Clark (Binghamton, New York: Medieval & Renaissance Texts & Studies in conjunction with The Renaissance Society of America, 1989), 3.3.255, 3.21.359. See also Finney, *Musical Backgrounds*, 103, 105-108.

[53] Furley, "Cosmology," 440, 444.

and “heaven as at some festival, / Will open wide the gates of her high palace hall” (133-4, 147-8). The binding potential of Heaven’s sound is also realized beneath the ground. If the heavenly music were to linger on Earth “hell itself will pass away,” but even its brief presence places strictures on “the old dragon under ground,” who finds himself at the moment of Christ’s birth “in straiter limits bound” (139, 168-9). The formidable Christ-child, who, like a new sun conquers the pagan gods as if with planetary spirit, the blinding “rays of Bethlehem,” is also armed with the power of constriction: “Our babe to show his Godhead true, / Can in his swaddling bands control the damned crew” (223, 227-8). The son’s ability to hold together, bind, or unite the parts of the Earth comes a boon to Creation and a bane to its enemies.

The “music sweet” of the angel choir, the imagined accompaniment of the crystal spheres, and the recollected song of Creation are all representations of divine acoustics that imagine a sound so exquisite and so compelling that no cosmic flaw can withstand the fortifying restorative process it initiates in the world. But they also describe either exceptional moments in time or an ideal reality when Nature is either unfallen or divinely regenerated. Barring this, the Earth’s atmosphere is incapable of producing such alleviating music on its own. Without the informing influence of the Word or Logos, Nature lacks the text or score of the divine song.

We should not be too quick to conclude, however, that in Nature’s embrace the air is soundless or disruptive to cosmic unity. Even without God’s particular blessing, Nature still breathes of her own accord (as we see in stanza II) and though her respirations are verbalized instead of bodied forth in music, they too exercise a measure of control or

"holding power" over the elements. Nature, after all, causes the seasons to change at the beginning of the hymn. The gradations between Nature's authority over the physical world and that of the divine music, may be attributed to the fact that, in addition to embodying the musical nature of the cosmos and distributing harmonious influence throughout the universe, vapors, as I have already indicated, were believed to perform a vital *naturalistic* function in the world, impelling all of its meteorological processes. The latter seems to be the role afforded to the voice of Nature in the *Nativity Ode.* Her speech, though not musical in itself, governs the world's astro-meteorological motions until the perfectly harmonious voices of God and the angels impose a more excellent order on all of its parts. Thus, the promise of a "happier union" that Nature perceives in the divine sounds of the angelic choir suggests that there are two possible versions of cosmic embrace, one meta-musical and one physical. We have already touched on the first, which is world harmony, or a state of cosmic order that reflects and expresses the proportioned, mathematical nature of music. The choir's euphony in *The Nativity Ode* is an emblem of what Milton considers the consummate form of world harmony, which can only be attained through the redemption of Christ, and it also represents actual the vehicle of this unification: the infusion of the air with music, that life-giving spirit that knits together the regions of Heaven and Earth.[54] The other version of world-synthesis glanced at in Nature's allusion to a "happier union" is, of course, the *less* happy form of unity that Nature offers prior to the coming of Christ and must sustain to some extent until his

[54] Ficino, some of the Neo-platonists, and some Hermetic works, all held it possible to transfer celestial and prophetic influence to man, and even inanimate things, via music, because of its natural sympathy to the cosmic order. See Finney, *Musical Backgrounds*, 105-9.

return. Recalling Pliny's depiction of the atmosphere from the *Natural History* may help us to imagine what Nature's imperfect hold on the world resembles. In that description, moisture gets pulled up and buffeted down again, and the sky continually sucks the breath from the Earth, as do its creatures from the sky. The layers of elements in between—earth, water, air, and fire—are firmly held together, implicitly by the "tension" of world spirit or breath and explicitly by opposite attractive and propulsive forces, but the result is more like a battle between the elements than a peaceful embrace. Perhaps this turbulent equilibrium is the only kind of "union" that Nature's voice may secure in the absence of the harmonizing power of the Word.

The loudness of a warring atmosphere (e.g. the raving of the ocean [67]) is not the only harsh sound supposed to have preceded the silence of that holy night. The man-made noise of war or "battle's sound" is also referenced at the beginning of the ode (53). The source of these discordances and, more broadly speaking, the weak holding power of Nature's breath remains unexplained. For answers we must turn to the last third of the hymn (stanzas 19-27), which switches from considering the miraculous universal effects of heavenly sound to examining the compromised vocality of the fallen atmosphere. The necessity of including these stanzas, which relate an episode from Prudentius on the cessation of the oracles, lies in the exigencies of cosmic renewal. To make the Earth anew, God needs to begin with a clean slate: "Before it can be redeemed, the world must first be purged of its impurities in a global act of exorcism."[55] It is worth noting that the evidence Milton gives of this great act of purgation is overwhelmingly oral or acoustical

[55] Evans, *The Miltonic Moment*, 33.

in nature. The departure of the pagan gods from their shrines, the Earth's response to their surrender, and their worshippers' futile initiation rites are all figured in acoustical terms or with respect to the absence of sound that the oracles leave behind. These two representational strategies are apparent in the introductory stanza (XIX) of this section:

> The oracles are dumb,
> No voice or hideous hum
> Runs through the arched roof in words deceiving.
> Apollo from his shrine
> Can no more divine,
> With hollow shriek the steep of Delphos leaving.
> No nightly trance, or breathed spell,
> Inspires the pale-eyed priest from the prophetic cell.
>
> (173-80)

By portraying the expiration of divinatory voices the stanza reverberates, in spite of itself, with the breathy sound of these profane utterances: the "hideous hum," "words deceiving," "nightly trance," and "breathed spell." Its three "no's" symbolize the muting of the oracles; but as a mimetic device for representing silence, the negations are not quite successful. Depending on how one scans lines 174 and 179, the two initial negations, but the second one especially, receive more emphasis than a regular unstressed syllable because of their position at the head of the line and because they create a refrain. Thus, even as the word "no" semantically cancels out the sound of inspiring gods, experientially, it amplifies the sounds of the stanza. The line "with hollow shriek the

steep of Delphos leaving" (178)—the only description of an actual sound as opposed to the memory of one—confirms the impression that the other lines give: the cessation of the oracles is an audible event with profound sonic consequences. The result is not merely the erasure of deceitful influences from the world, though this is certainly one of the event's effects, but also the moral and physical transformation of earthly sound.

The expulsion of oracular spirits from the world directly enables this transformation because their communications, even their bodies, were thought to be implicit in the medium of sound. In animist philosophies and religions, the breath or spirit of the world was believed to be present in all stages of material refinement, from plants and minerals to man, and beyond him, in beings of another sort: "Demons and genii were 'personalized' world spirit, clothed in air."[56] For Milton, spirits like these, while they abided in the air, threatened the universal voice that runs through all Creation. It cannot be redeemed while it also conveys the false, misleading intimations of contrary spirits. In his ode, they appear as the tutelary gods, whose words echo through the "arched roof" of the sky, and who populate the "haunted spring, and dale" and "urns, and altars round" (175, 184, 192).

When struck from the places and objects that contained them, these demons, because they are personalized expressions of the universal breath, emanate either in acoustical form or through the meteorological mechanism of the air. The sounds they make as the Earth releases them are everywhere: "A voice of weeping" and "loud lament" resounds over the land as the spirits flee the Christ-child, and "the parting genius

[56] Finney, *Musical Backgrounds*, 104.

is with sighing sent" (183, 186). Similarly, the demons enclosed in the earth and its holy edifices "moan with midnight plaint" and make a "drear and dying sound" as they leave their containers (191, 193). The distinction between the breath of the world and the spirits themselves, already blurred in these descriptions of their departing sounds, is even further confused when Milton depicts them as emerging from within the very walls of their temples: "And the chill marble seems to sweat, / While each peculiar power forgoes his wonted seat" (195-6). The imagery in these lines is rather complex. The image of sweating expresses metaphorically the literal activity of the spirits leaving the stone and recalls the purgative effects of this physiological process. Simultaneously, the allusion to sweat on the "chill marble" recalls the formation of liquid from the air on cool surfaces, in other words, the process of condensation. The doubling-up of biological and meteorological figures implies that, in addition to being forced out of the marble, much like beads of sweat from a body, the powers are also drawn out of the surrounding air and deposited on the stone like drops of dew. The spirits' emergence from both the stone and the air may be explained by Milton's view that demons are present in all of the elements, which he expresses in lines 93-94 of *Il Penseroso*, citing the authority of Hermes Trismegistus and Plato.[57] By portraying the overpowered spirits of the *Nativity Ode* as a collection of horrible sounds and emphasizing their omnipresence in the world by depicting them as local genii and ingredients, even, of the elements themselves, the ode asserts that before the birth of Christ, Nature's acoustical capacity, or her "breath," was

[57] Milton mentions Hermes and Plato directly before the doctrine of the elemental demons. Such spirits are discussed in Hermes, Marsilio Ficino's commentary on Plato's *Symposium*, and the Orphic hymns. See John Carey, *Milton: The Complete Shorter Poems*, 148n93.

compromised because it contained the bodies of demons and carried their deluding voices. The dilution of the world spirit by these evil agents also explains why Nature's unifying power is weaker than that of the divine music.

The additional suggestion that personalized spirit may be passed from the Earth either through secretion, much like sweat, or the meteorological process of condensation, reinforces the association Milton makes at the beginning of the poem between exhalation and the voice of Nature. The descriptions of Nature exhaling the instructions for making snow and, in the last section of the ode, complaining as it sweats out bad vapors, imply that, in a very real sense, the Earth has a breathing, perspiring, and speaking body that expresses itself vocally with its weather-causing exhalations. Milton's suggestion that exhalation provides a passage out of the world (as it does for "each fettered ghost" [234]) captures something of Lucretius' atomist explanation of the rapid formation of storm clouds: "It is no wonder then if often within a short time tempest and darkness overhanging above cover up sea and land with storm-clouds so great, since from all quarters through all the passages of the ether, and as it were, through the breathing-channels of the great world around, there are comings-in and goings-out for the elements."[58]

Milton was to revisit the idea of exorcism as a meteorologically and physiologically productive process in the masque performed for the Earl of Bridgewater in 1634 and later known as *Comus*. Having been sharply rebuked with "words set off by some superior power," the masque's villain fearfully observes that

---

[58] *De Rerum Natura*, 6.489-494, p. 529.

a cold shuddering dew

Dips me all o'er, as when the wrath of Jove

Speaks thunder, and the chains of Erebus

To some of Saturn's crew.

(801-4)

As in the *Nativity Ode*, the suffusion of the air with divinely powerful sounds initiates a process of disintegrating evil from the world that is simultaneously bodily and meteorological—Comus seems to sweat, but calls his perspiration "dew." The analogy he draws between himself and "some of Saturn's crew" continues the idea that divine or righteous speech actualizes itself and eradicates evil meteorologically: Jove "speaks thunder" and vanquishes the Titans. Its ancient association with exhalation seems to license the idea for Milton that speech or sound of a certain virtue can dislodge evil from latent or incorporate states.

Though it is devoid of human speakers (apart from the "simply chatting" shepherds) *The Nativity Ode* is incontestably a sonorant work, abounding with representations of speech, music, echoes, screams and laments, even deafening blasts. These sounds and utterances emanate from giant figures—God, Fate, Nature, Apollo, to name a few—and intervene in cosmic processes: the setting of the stars, the rising of the sun, the falling of snow, the quaking of the Earth, and the subduing of wind and sea. One might argue that the vocalization of these processes has the effect of domesticating the cosmos, or habituating the divine to the mundane world. Yet the inverse effect is more

powerfully achieved. By endowing the universe with vocality and sonic might, Milton environmentalizes speech and sound. Acoustics are dissociated from the human subject and associated, rather, with the spaces they fill up. One might even say that Milton achieves an architectural understanding of sound in that he is continually concerned with the reverberations of different sounds inside domes ("beneath the hollow round / Of Cynthia's seat," or "through the arched roof" of the world) or other structures (on hearths, in alters and temples, and even in Hell's "dolorous mansions") (102, 140, 175, 190, 192, 198). By defining sound within its context, Milton dispels the assumption that it can be controlled and confined by man. The focus shifts from the sound maker to the virtues implicit in sound itself, which it absorbs from and transmits to its environment.

In confronting sound as a function of environment, rather than as a product of the individual, readers are reminded of the basic dependency of our voices on the air. In order to speak we must draw in breath, and though we normally are not aware of it, our breath partakes of the greater respirations of the world. *The Nativity Ode* argues that even Nature, who may seem our truest guide on Earth and who indeed ministers the breath of life, is herself corrupted and weakened by adverse voices. On the other hand Christ, the very embodiment of the Logos, realizes simply by being born a state of perfect harmony in the world, thereby eradicating all of its desecrating sounds. But he leaves the archenemy of man intact, though confined, underground, until he returns at the "world's last session." From this course of events we should not conclude that the earthly fabric of sound and voice has forever been healed. The subsistence of evil in Earth's very soil is reason enough to suppose that bad spiritual influence again will permeate the air. The

captivation of the air, as we learn in *The Nativity Ode*, through compelling speech or exquisite music, is a critical strategy for dictating the nature of its moral and physical influence. As a poet, Milton is very interested in achieving and refining this sense of control. Without abandoning the environmental conception of sound developed in *The Nativity Ode* and some of his other university works, Milton goes on in *Comus* to investigate the experience of the human subject within a fallen sonic environment and the possibility of confidently navigating and even mastering the acoustical terrain. Chapter 2 balances these concerns against some of the major the ideas and events of the Renaissance that gave rise to new ways of thinking about and defining sound.

Chapter 2: Early Acoustic Theory and the Aural Soul in *Comus*

Milton's announcement in the last stanza of the *Nativity Ode* that it is time his "tedious song" should end seems like an unsatisfying and possibly insincere conclusion to a work that he must have known displayed poetic genius (239). But it is perhaps an appropriate way to signal the necessary textual ending of a song whose action is decidedly *not* over, and, in a sense, has only just begun. With his ministry and passion all untried, the Christ-child's lullaby can only be a prelude to greater and richer music about his life.

As with any musical setting, Milton's poetic opus is not without its darker movements, and many passages mix together sweet and sorrowful tones. In fact, he seemed to think that acoustical performances *by definition* would invariably contain these moments of moral counterpoint. As the previous chapter argues, Christ's birth eliminates the prophetic power of the ancient oracles, but does not completely purify the universal voice. The divine sound that blesses the Earth at the Nativity—the vehicle of cosmological order, supreme joy, and truth—will not be restored until the Messiah returns and redeems the world. The poet's difficult work, then, a labor of distilling the fallen atmosphere and arranging it into exquisite harmonies, commences rather than

concludes with his song of the Incarnation. The gift of the incarnate Word inspires his voice and the angelic music he witnesses serves as a poetic model; but the tractability of the air that announces Heaven's presence at the Nativity jeopardizes the integrity of his artistic medium and, because of its facile adoption of foreign influences, poses a challenge to his life's work. The poet's obligation, which Milton fulfills over a lifetime of tedious singing, is to rescue the air from nefarious and defiling influences. Never assured of pure sonic materials, he must content himself with making poetry by always working backward from a state of dissonance to one of musical concent. As *At a Solemn Music* prescribes, he must answer God "with undiscording voice" (17).

In his next major work, *A Masque Presented at Ludlow Castle*, henceforth referred to as *Comus*, Milton resumes his laborious song, whose theme this time focuses on the personal attainment of acoustical adroitness. The shift in Milton's focus from an environmental perspective in *The Nativity Ode* to an individual one in *Comus* reveals itself in the masque's delicate denial of many of the more artificial and stylized elements of the courtly genre.[1] Rather than portraying an abstract or allegorical scenario, in which the characters are meant to personify Platonic virtues, call to mind members of the Caroline Court, or embody parts of the cosmos, *Comus* had a concrete and particular

[1] Leah Marcus proposes that *Comus* "raise[s] generic expectations" only to "frustrate them," for example, by portraying the Attendant Spirit as recently arrived from "the starrie threshold of *Iove's* Court," signaling an association between Charles I and Jove, but then distancing the Spirit's origins entirely from this world, much less Whitehall. See *The Politics of Mirth: Jonson, Herrick, Milton, Marvell, and the Defense of Old Holiday Pastimes* (Chicago: The University of Chicago Press, 1986), 180-81. See also David Norbrook, "The Reformation of the Masque," in *The Court Masque*, ed. David Lindley (Manchester: Manchester University Press, 1984), 94-110; Maryann Cale McGuire, *Milton's Puritan Masque* (Athens: University of Georgia Press, 1983), 6; and Cedric C. Brown, *John Milton's Aristocratic Entertainments* (Cambridge: Cambridge University Press, 1985).

relevance to its first audience.[2] The masque's main actors, the daughter and two sons of John Egerton, the First Earl of Bridgewater and newly appointed President of the Council in the Marches of Wales, appear in the production as themselves. The plot device of their journey through the woods, though itself an invention, is occasioned by the real event of the Earl's political inauguration, and the narrative concludes with the children arriving at Ludlow Castle, the very place where the masque was staged. These meta-theatrical elements, which create the sense that the characters' trial is both grave and real, are imbedded, however, in a story of the Lady's detainment in the forest by a formidable sorcerer, a fantastic tale that draws on myth, folklore, and philosophy. One might argue that the masque's marvelous aspects—for instance, the incredible notion, borrowed from the *Odyssey*, that the Lady's assailant, can turn unwary passersby into beast-headed monsters, but may still be neutralized by a magical plant—temper the authenticity of her moral crisis, and make it less instructive to the ordinary individual. But I offer a different interpretation: the Lady's confrontations with the deceptive and threatening environment of the Forest of Dean depicted in *Comus*, which foists sensations and effects on her that seem highly improbable to us, illustrate roughly two contending modes of knowing the natural world in the early part of the seventeenth century. At various points in the masque the Lady and her brothers are invited to analyze experiences with the tools of Renaissance magic as well as the relatively novel experimental method, which combined the hitherto separate sciences of mathematics and physics.

---

[2] The decision, for instance, to give the young Egerton children full dramatic roles and to make their parts central to the masque has been called unusual, and said to create a sense of realism that "came close to being subversive of the form"; Brown, *Milton's Aristocratic Entertainments,* 78-103.

At the time of *Comus'*s composition in 1634, neither of these approaches to understanding nature had eclipsed the other. Though the Church officially condemned it, magic was widely studied and practiced in the seventeenth century at all levels of society and in a variety of ways. The recuperation of Neoplatonist writings and ancient works such as the *Hermetica* undertaken during the Italian Renaissance by Pico della Mirandola and Ficino, and Heinrich Cornelius Agrippa's synthesis of the magical aspects of these works into a coherent "occult philosophy," contributed to a culturally broad European fascination with magic in the sixteenth and seventeenth centuries.[3] Magic had an unstable disciplinary and social status during this period, but nevertheless was integral to bringing about the transformation of natural philosophy into an experimental science.[4] At the same time, the Scholastic philosophy maintained a foothold in the seventeenth-century pedagogy of science. In the early part of the century, the English Universities were strongholds for Aristotelian thought, and, although they discredited scholastic methods, many pioneers of the experimental science, such as Francis Bacon, Galileo Galilei, and Rene Descartes, were in part indebted to Aristotle's ideas.[5] But the thorough revamping

---

[3] Ficino produced an edition of the *Corpus Hermeticum* in 1463, and his *Opera Omnia* was published posthumously in 1576. Agrippa's *De occulta philosophia* appeared in 1533 and was translated into English in 1651. See Penelope Gouk, *Music, Science and Natural Magic in Seventeenth-Century England* (New Haven and London: Yale University Press, 1999), 68-72.

[4] Gouk, *Music, Science and Natural Magic,* 66-111.

[5] For a discussion of the traditional academic curriculum at Cambridge, see William Costello, *The Scholastic Curriculum at Early Seventeenth Century Cambridge* (Cambridge, Mass.: Harvard University, 1958). Scholasticism was more entrenched at Oxford than Cambridge, though the Universities' curriculum did not differ much (p. 2-3). Gouk notes that although Bacon condemns scholastic methodologies in his pursuit of acoustical knowledge, he relies substantially in *Sylva Sylvarum* on Aristotle and his disciples' explanations of sound; see *Music, Science and Natural Magic*, 159-60. Craig Martin argues that Descartes' *Les Météores* continues, rather than breaks with, a tradition Aristotelian meteorologies by excluding formal and final causation from its procedures; see "Causation in Descartes' *Les Meteores* and Late Renaissance Aristotelian Meteorology" in *The Mechanization of Natural Philosophy*, edited by Sophie Roux and Dan

of scientific inquiry was already underway in the century before these individuals largely were active. Revolutionary developments in astronomy such as the publication of Copernicus' *De Revolutionibus Orbium Coelestium* (*On the Revolutions of the Heavenly Spheres*) in 1543, Tycho Brahe's observations of celestial phenomena in the 1570s and 80s, Johannes Kepler's calculations of the planetary motions, and finally, the shocking discoveries of Galileo's telescope, published in the *Siderius Nuncius* (*Starry Messenger*) in 1610, had the gradual effect of undermining Aristotelian physics, establishing mathematics as fundamental to natural philosophy, and promoting the status of the mathematician to that of a full-blown philosopher.[6] While these momentous findings were well known (Copernicus's argument for heliocentricity traveled to England as early as 1576 in Thomas Digges's summary and translation) the experimental mentality which guided them was not yet institutionally sponsored (as it would later be by the Royal Society) nor directed toward a central school of thought in the first half of the seventeenth century.[7] Daniel Garber recently argued that none of the radical thinkers from the early part of the seventeenth century, strictly speaking, adhered to what later

---

Garber (Dordrecht: Springer, 2013), 217-36. Galileo builds off problems posed in the Aristotelian *Mechanica* in his *Discorsi e Dimostrazioni Matematiche Intorno a Due Nuove Scienze* (*Two New Sciences*); see Daniel Garber, "Remarks on the Pre-History of the Mechanical Philosophy" in *The Mechanization of Natural Philosophy*, 13.

[6] "Before the intellectual status of mathematicians had been raised by Copernicus and other Renaissance *mathematici* there was natural philosophy and there was mathematics and they were essentially separate and distinct….By the final decades of the seventeenth century…the notion that there could be mathematical principles of natural philosophy could be taken for granted"; John Henry, *The Scientific Revolution and the Origins of Modern Science*, 2nd edition (Houndmills, Basingstoke, Hampshire: Palgrave, 2002), 28. For a concise history of how the revolution in astronomy, among other factors, led to the mathematization of natural philosophy, see pages 14-29.

[7] On Digges's rendition of Copernicus's cosmology, published in a *Perfit Description of the Caelestiall Orbes* (1576), see Dennis Danielson, "Astronomy," in *Milton in Context*, ed. Stephen Dobranski (Cambridge: Cambridge University Press, 2010), 213-14.

contemporaries and historiographers now refer to as the mechanical philosophy, one of the main intellectual movements to emerge from this period of philosophical upheaval, but rather "saw themselves as elements in this hurly-burly of anti-Aristotelian philosophies, each fighting against one another to become the new direction for philosophy to take."[8]

It was during these years of philosophical free-for-all that Milton composed *Comus* and the masque was performed. The masque's first printing in 1637 predates many of the founding documents of the new physics, for instance, Galileo's *Discorsi e Dimostrazioni Matematiche Intorno a Due Nuove Scienze* (*Two New Sciences*) and Descartes' *Principia Philosophaie*, which appeared in 1638 and 1644. Perhaps because Milton's work was conceived before the victory of experimental science could be definitively declared, and at a further remove from the establishment of the corpuscular philosophy, its engagement with contemporary perspectives in natural philosophy has not attracted particular notice.[9] Nevertheless, in probing the limits and potential dilation of the human senses, Milton's masque displays an interest in what were known as the

[8] Garber, "Remarks on the Pre-History of the Mechanical Philosophy," 25-6.

[9] Stephen Fallon examines the particular brand of Platonism *Comus* displays in his survey of the philosophical contexts of Milton's works, but does not mention possible influences such as the occult philosophy or contemporary developments in experimental science; *Milton Among the Philosophers*: *Poetry and Materialism in Seventeenth-Century England* (Ithaca, New York: Cornell University Press, 1991), 81-3. Angelica Duran places *Comus* in the scientific climate of the seventeenth century, reading the rational conduct of the Lady in the woods as reflecting shifts in educational practices for noblewomen, ornithology, and the study of sound. Many of the scientific sources Duran deal with postdate the masque, and though Duran draws a brilliant comparison between the Lady's aural comportment and the tenets' of Francis Bacon's acoustical program, no other acoustical theory is mentioned except the promise of distant research in "the second half of the seventeenth century"; see *The Age of Milton and the Scientific Revolution* (Pittsburgh: Dusquesne University Press, 2007), 225-49. Karen Edwards focuses primarily on the scientific contexts of *Paradise Lost* in *Milton and the Natural World: Science and Poetry in* Paradise Lost (Cambridge: Cambridge University Press, 1999), as do Joanna Picciotto, *Labors of Innocence in Early Modern England* (Cambridge, Mass.: Harvard University Press, 2010) and Harinder Marjara, *Contemplation of Created Things: Science in* Paradise Lost (Toronto: University of Toronto Press, 1992).

"mixed mathematical sciences," an Aristotelian category of knowledge that encompassed subjects such as astronomy, optics, music, and mechanics that were considered subordinate derivations of natural philosophy, but became increasingly relevant in the sixteenth and seventeenth centuries with the new emphasis in science on practical demonstration.[10] The era's revaluation of these subjects and the simultaneous reshaping of traditional learning by the integration of techniques from the mechanical arts reflect the humanist "tendency to consider practical science superior to theoretical knowledge."[11]

The reappraisal of practical or artisanal knowledge is particularly evident in the pathways along which the study of music, one of the "mixed sciences," evolved in the sixteenth and seventeenth centuries. In the Renaissance, the musician's concrete knowledge of his craft—formerly of no concern to the student of music theory—informed a new conception of music "in which sound is thought of in terms of movement" rather than number or ratios.[12] For centuries, the Pythagorean idea of harmony with its strictly numerical understanding of musically acceptable or "consonant" intervals held sway in music theory, but innovations in musical composition and instrumentation during the Renaissance demanded the reevaluation of musical sound on

---

[10] On the Aristotelian organization of the mixed sciences and their eventual elevation in social, academic, and intellectual spheres, see Penelope Gouk, *Music, Science and Natural Magic*, 82-4, and John Henry, *The Scientific Revolution and the Origins of Modern Science*, 18.

[11] Paolo Rossi, *Francis Bacon: From Magic to Science,* trans. Sacha Rabinovitch (London: Routledge & Kegan Paul, 1968), 7.

[12] Paolo Gozza, ed., *Number to Sound: The Musical Way to the Scientific Revolution* (Dordrecht: Kluwer Academic Publishers, 2000), xi.

physical grounds.[13] The pioneers of this new science of music enlisted actual instruments in their tests, and rather than accepting that certain intervals are more pleasing than others because of their cosmological significance, strove to arrive at a theory of consonance by examining the vibrational behavior of strings.[14] Vincenzo Galilei (1520-1591), father of Galileo Galilei, is a good example of a musician who objected to the Pythagoreans' insistence that only ratios of certain whole numbers produce consonant intervals, and challenged this assumption through experiment.[15]

Before these methods yielded a mathematically and physically verifiable description of pitched sound—a task that would fall to the French Friar and enthusiastic experimentalist Marin Mersenne—a variety of other models for conceptualizing sound were in play. A key alternative tradition was natural magic, which one scholar calls a "pre-modern form of natural science."[16] This specific kind of "white" magic, espoused by thinkers such as Giambattista della Porta, Agrippa, Robert Fludd, and to some extent, Francis Bacon, focused on harnessing the "occult" or hidden properties of nature to produce remarkable effects, and was distinguished from demonic forms of magic, which

---

[13] Paolo Mancosu, "Acoustics and Optics" in *Cambridge History of Science, Volume 3: Early Modern Science*, edited by Katharine Park and Lorraine Daston (Cambridge: Cambridge University Press, 2006), 598-602.

[14] Vincenzo Galilei developed an experiment to disprove the claim traditionally attributed to Pythagoreas that strings pulled tight by weights that correspond to the musically "perfect" ratios produce consonant pitches. Galileo, Vincenzo's son conjectured that consonance, following Giovanni Battista Benedetti (1530–1590), is purely a consequence of the regular coincidence of the vibrations of two differently-pitched, simultaneously vibrating strings. Marin Mersenne advanced this "coincidence" theory of consonance with precise experiments and defined many other attributes of sound, such as its speed, with physical experimentation. See Mancosu, "Acoustics and Optics," 603, 605-8.

[15] For an account of Vincenzo's major experiments see Mancosu, "Acoustics and Optics," 603-4.

[16] Wayne Shumaker, *The Occult Sciences in the Renaissance: A Study in Intellectual Patterns* (Berkeley: University of California Press, 1972), 108.

depend on invoking demons or making a pact with the devil.[17] Agrippa, who was widely read in England, offers a representative definition:

> Therefore natural magic is that which having contemplated the virtues of all natural and celestial things and carefully studied their order proceeds to make known the hidden and secret powers of nature in such a way that inferior and superior things are joined by an interchanging application of each to each; thus incredible miracles are often accomplished not so much by art as by nature to whom this art is as a servant when working at these things. For this reason magicians are like careful explorers of nature only directing what nature has formerly prepared, uniting actives to passives and often succeeding in anticipating results so that these things are popularly held to be miracles when they are really no more than anticipations of natural operations.[18]

Magicians of this stamp should be well versed in mathematics and physics as Agrippa points out elsewhere, "and knowing the middle sciences of both these, Arithmetick, Musick, Geometry, Opticks, Astronomie, and such sciences that are of weights, measures, proportions, articles and joynts, knowing also the Mechanicall Arts resulting

---

[17] Penelope Gouk discusses some of the distinctions between kinds of magic in the Renaissance. Agrippa's categorization between ceremonial, celestial, and natural magic was apparently well known. The medieval magician Roger Bacon distinguished between "real" and artificial magic. See *Music, Science, and Natural Magic*, 71, 85-6.

[18] Cornelius Agrippa, *De incertitudine et vanitate scientiarum* (Cologne, 1527): Italian trans. Venice, 1659, Ch. XLII, p.57v; English trans. James Sanford, *Of the Vanitie and Uncertaintie of Artes and Sciences* (London, 1569), qtd. in Rossi, *Francis Bacon*, 18-19.

from these, may without any wonder…do many wonderfull things."[19] Magic's association with mathematics and mechanics, indeed its frequent reliance on machines and artificial devices to bring out and display the secret powers implicit in nature, made it an important precursor to experimental science. In the words of John Henry, "the scientific worldview developed, at least in part, out of a wedding of natural philosophy with the pragmatic and empirical tradition of natural magic."[20] Penelope Gouk makes a related claim with respect to the scientific study of sound. She argues that the discipline of acoustics as it was first practiced in the seventeenth century was largely adapted from the tradition of natural magic.[21] Her research on the history of acoustics in England shows that the emergence of this science cannot be fully explained by the revolution in physics, but depends on an inheritance of customs, demonstrations, and theory from the tradition of Renaissance natural magic, which valued the explanatory power of music and implemented musical instruments in its magical performances.[22] Thus, while individuals like Vincenzo Galilei and his son laid the theoretical groundwork for developments in modern acoustics like Mersenne's laws of vibrating strings (mathematical formulae determining the potential frequency of a stretched string) a number of authors in a disparate magical tradition, including John Dee and Robert Fludd, developed a parallel

---

[19] *Three Books of Occult Philosophy, written by Henry Cornelius Agrippa, Translated out of the Latin into the English Tongue, by J.F.* (London, 1651), pp. 167-9, qtd. in Gouk, *Music, Science, and Natural Magic*, 85.

[20] Henry, *The Scientific Revolution*, 55-56.

[21] *Music, Science, and Natural Magic*, 158.

[22] For a summary of Gouk's findings regarding the relationship between music and magic in the sixteenth and seventeenth centuries see *Music, Science, and Natural Magic*, 110. Chapter 3 of *Music, Science, and Natural Magic*, entitled "Intellectual Geographies" charts how the "cognitive domains," as Gouk calls them, of music, magic, and experimental philosophy interrelate; see pp. 66-111.

idea of music that would also greatly influence "scientific" acoustical inquiry in the seventeenth century.[23] Works in this tradition uphold the mathematical and Neoplatonic concepts of music as a dynamic medium between macro- and microcosms and document the proliferation of musical instruments in the early seventeenth century by depicting their variety of forms and operations.[24]

My analysis of aural phenomena in *Comus* reveals Milton's familiarity with a variety of pre-Galilean acoustical theories, particularly Ficinian music-spirit theory and Francis Bacon's notes toward an acoustical program in *Sylva Sylvarum*. By bringing out the masque's engagements with this eclectic body of literature, pieces of which get taken up by physicists in the late 1630s, this chapter argues that *Comus* reflects one of the main conflicts inherent in the science of sound at this transitional stage of its history—namely, the development of a practical science of music and acoustics in the absence of a mechanical theory of sound transmission. While the study of music gradually merged with the mechanical arts in the Renaissance, bearing out the humanist impulse to understand the psychological effects of sound and discover how best to control and use it, the coherence of acoustics as an objective science at the beginning of the seventeenth century was limited by the fact that its explanatory paradigms, even its experimental method, depended largely on magical and scholastic concepts. The occult underpinnings

---

[23] For a summary of Mersenne's acoustical contributions, whose laws first appeared in *Harmonie Universelle* (1636), see Penelope Gouk, *Music, Science, and Natural Magic*, 170-8. Gouk discusses Dee and Fludd on pp. 86-8, 95-101

[24] Fludd's *History of the Macrocosm and Microcosm* (1617-21) includes descriptions of common instruments as well as musical devices from his imagination, "an indicator of current developments in musical technology." Gouk argues that later writers in the acoustical tradition such as Bacon and Athanasius Kircher who were interested in how instruments project sound drew liberally from Fludd in this respect. See *Music, Science, and Natural Magic*, 100-101.

of acoustic explanation have complex ramifications for a Puritan poet like Milton. He seems to have implicitly supported the philosophical aims of Bacon's new program of acoustical inquiry insofar as it employed rational means to increase the individual's powers of discernment through hearing and command over the voice. But the masque's occasional skepticism of the accuracy of sounds and the psychological consequences of music suggests that he also found cause for concern in the occult foundations of contemporary acoustical theory, and possibly, in its attitude toward the artificial manufacture of sound.

Francis Bacon is a pivotal figure in the murky, primal landscape of experimental acoustics. The subjects of music and sound occupy substantial space in his comprehensive work of natural history, *Sylva Sylvarum*, and portions of the *New Atlantis*, both published posthumously in 1626. Bacon's consideration of acoustics was not only extensive, but also revolutionary in its approach. His writings, for one, "were the first (in English natural philosophy) to discuss music outside the context of the mathematical ratio."[25] He rejects numerical, Pythagorean-Platonic explanations of musical harmony because of their detachment from observable fact. In contrast to existing music theory, whose "mystical subtleties" fail to account for the actual experience of musical practice, his examination of music, he asserts, will "join the contemplative and active part together."[26] Accordingly, he proposes a vast number of acoustical experiments in *Sylva Sylvarum*, many involving instruments, others the human voice and various kinds of

[25] Penelope Gouk, "Music in Francis Bacon's Natural Philosophy" in *Number to Sound: The Musical Way to the Scientific Revolution*, ed. Paolo Gozza, 136, see n. 12.
[26] Francis Bacon, *Sylva Sylvarum* in *The Works of Francis Bacon*, edited by James Spedding, Robert Ellis, and Douglas Heath, vol. 2 of 14 (London, 1857), 385.

sound-carrying media, to investigate the properties of sound directly, and to determine how it might be altered or manipulated to serve human needs. The role that instruments and artificial techniques plays in Bacon's program of acoustical inquiry recalls the emphasis on mechanical contrivance in musical writings from the magical tradition. Indeed, a large number of Bacon's experiments were taken directly from Giambattista della Porta's *Magia Naturalis* (1589).[27]

The concept of *spiritus* underlying Bacon's theory of sound transmission and perception grows out of a vitalist tradition that differs sharply from the mechanical philosophy. His explanations of the phenomenon known as musical sympathy (i.e. the sympathetic vibration of strings) and of hearing depend on the notion that all matter, whether animate or inanimate, contains this pneumatic *spiritus* that has the ability to perceive stimuli.[28] The interaction of the "species" of sound, "an immaterial entity containing all the qualities of the sounding body within itself" with the *spiritus* found in the body and the external world is what accounts for auditory experience, according to Bacon.[29] Thus, the "species" of sound emitted by an instrument may cause a nearby instrument to resonate sympathetically by mingling with is spiritual, pneumatic parts; similarly with the human body, the species of sound enters the ear where it impresses

---

[27] Furthermore, Bacon's suggestion that a mannequin might possibly be made to imitate speech, recalls the legend of the magically-operated speaking head of the medieval magus Roger Bacon. See Gouk, *Music, Science, and Natural Magic,* 160, 162, 166-8.

[28] On Bacon's belief in the existence of *spiritus* in all matter and his idea that inanimate things have the ability to "perceive," see D. P. Walker, "Francis Bacon and *Spiritus*," in *Music, Spirit and Language in the Renaissance*, edited by Penelope Gouk (London: Varorium Reprints, 1985), 122-3. For a brief history of the role of the "species" in explanations of sound perception, see Charles Burnett, "Sound and its Perception in the Middle Ages" in *The Second Sense: Studies in Hearing and Musical Judgement from Antiquity to the Seventeenth Century*, edited by Charles Burnett, Michael Fend, and Penelope Gouk (London: Warburg Institute University of London, 1991), 61-2.

[29] Penelope Gouk, "Music in Francis Bacon's Natural Philosophy," 140.

itself on the body's *spiritus*, which in turn carries the sensation to the brain initiating the body's physical response.[30] Bacon subscribed to the magical views that *spiritus* was susceptible to astrological influences and might be acted upon and altered by another person's imagination (or that of an intermediary).[31] The susceptibility of the *spiritus* in the human body to outward influences is an assumption of Bacon's acoustic theory. He follows Ficino in identifying musical harmony as the strongest stimulus to the *spiritus*, relative to, for example, taste or smell, reasoning that "the sense of hearing striketh the spirits more immediately than the other senses, and more incorporeally than the smelling."[32] More than just a sensation, music causes man to feel passions, because its impact on the *spiritus* is not momentary like that of an odor, but lasting: "harmony, entering easily, and mingling not at all, and coming with a manifest motion, doth by custom of often affecting the spirits and putting them into one kind of posture, alter not a little the nature of the spirits, even when the object is removed."[33] It is difficult to judge the strength of such beliefs, which were founded on principles from occult philosophy, given Bacon's occasional denouncements of magic and his larger vision for a New Science that privileges keen observation, logical method, and collaborative learning over knowledge acquired on authority or through auricular traditions.[34] Yet the "presence of

---

[30] Penelope Gouk, "Some English Theories of Hearing in the Seventeenth Century: Before and After Descartes," in *The Second Sense*, 99, 102-3.
[31] Walker, "Francis Bacon and *Spiritus*," 127.
[32] Bacon, *The Works of Francis Bacon*, 2:389, § 114.
[33] Ibid.
[34] For example, in *Of the Dignity and Advancement of Learning*, Bacon denounces a "degenerate" form of natural magic, practiced in his day: that which "flutters about so many books, embracing certain credulous and superstitious traditions and observations concerning sympathies and antipathies, and hidden and specific properties, with experiments for the most part frivolous, and wonderful rather for the skill with

both mechanist and dynamic vitalist conceptions of reality in Bacon's physics" is undeniable.[35]

Because he regarded sound and music as subjects of natural philosophy, not just illustrations of the mystical power of number, and anticipated many experimental techniques that would be used in subsequent years to forge a fully mechanistic account of sound, Bacon's acoustical program can be characterized as pioneering. But it also included much lore from the tradition of natural magic, and explains the operation of sound and hearing with concepts from scholasticism and vitalism.[36] The coexistence of mechanistic and vitalist influences in Bacon's explanations of aural phenomena is also a feature of Milton's depiction of auditory experience in *Comus.* As I have already mentioned, Bacon's unique treatment of acoustics represented the most current research on sound in publication at this time. Thus it provides a crucial comparison point to acoustical representations in Milton's masque.

Like Bacon, Milton is not content in *Comus* to examine music from a Pythagorean-Platonic perspective by presenting it purely as a means of elevating the mind and revealing the mathematical nature of universe. [37] The exaltation of the intellect may be a desired consequence of song, but in practice, music is a product of sound. The

---

which the thing is concealed and masked than for the thing itself; it will not be wrong to say that it is as far differing in truth of nature from such a knowledge as we require, as the story of King Arthur of Britain, or Hugh of Bordeaux, and such like imaginary heroes, differs from Caesar's Commentaries in truth of story"; *The Works of Francis Bacon*, 4:275-498, 367.

[35] Rossi, *Francis Bacon: From Magic to Science*, 13.

[36] For Penelope Gouk, Bacon's reliance on the Aristotelian-scholastic concept of the "species" to explain the conveyance of sound is an indication that he "was conceptually very distant from the mechanical philosophers who believed that sound is purely the impact of motion on the ear, perceived as sound by the listener"; see "Music in Francis Bacon's Natural Philosophy," 140.

[37] "In Bacon's account of music's effects, the intellectual dimension of music and its effect on the rational soul is entirely ignored"; see Gouk, "Music in Francis Bacon's Natural Philosophy," 143.

masque measures music by its sensible properties: its ability to affect the passions, to travel long distances, to spring from refreshed spirits, etc. It also represents various other aural effects—the sound of riot, the hollering voice, echo, and silence—as objects of philosophical scrutiny, giving them a concrete existence outside of the perceiver's mind. Bacon calls the manifestation of sound outside the mind its "species" (discussed briefly above). The audible species is a quality distinct from the medium of sound that "behaves as though it is corporeal despite its immaterial nature" and acts on the perceiving body's *spiritus* independently of the air.[38] Bacon's belief that sound is not a motion, but a thing or quality that exists before it enters the perceiver's mind was characteristic of early theories of acoustics and distinguishes them from the mechanical explanations of Mersenne, Galileo, and Descartes, who viewed sound as the mind's translation of a simple movement of the air.[39] These two positions, however, were not the only viewpoints on the physical nature of sound in the sixteenth and seventeenth centuries.

Ficino's music-spirit theory represents a conceptual middle ground between an acoustical model like Bacon's, in which the species of sound but not the moving air mingles with the perceiver's spirit, and that of the mechanical philosophers who contended that the hearer only perceives percussions of air, but that nothing material or

---

[38] Gouk, "Music in Francis Bacon's Natural Philosophy," 140.

[39] Over the course of the late Renaissance through the late seventeenth century, the idea that sound was a mystical entity (either imbedded in the spiritual nature of air or in the special qualities or species emitted by sounding bodies) with a reality outside of the mind was gradually discarded for the mechanical description of sound as matter in motion. For the history of this intellectual transition, see Gretchen Ludke Finney, *Musical Backgrounds for English Literature: 1580-1650* (New Brunswick, New Jersey: Rutgers University Press, 1962), 139-58.

immaterial actually enters the ear.[40] Ficino contends that both air and movement are involved in the process of hearing. Both factors are crucial to his explanation of why music, more than anything else admitted by the senses, affects the spirit and through it, the soul. The similarity between the substance of music, "warm air, even breathing," and the airy substance of the *spiritus*, ensures its direct conveyance into the listener's spirits and transmission through the whole body.[41] Additionally, the fact that music "transmits movement and is itself moving" enables it to mimic the motions of the soul and spirit.[42] Ficino's discussion of the uniquely affective quality of music in his commentary on Plato's *Timaeus* demonstrates that the movement and aerial nature of song (along with emotional and intellectual content) are key sources of its power over the soul:

> But musical sound by the movement of the air moves the body: by purified air it excites the aerial spirit which is the bond of body and soul: by emotion it affects the senses and at the same time the soul: by meaning it works on the mind: finally, by the very movement of the subtle air it penetrates strongly: by its contemperation it flows smoothly: by the conformity of its quality it floods us with a wonderful pleasure: by its nature, both spiritual and material, it at once seizes, and claims as its own, man in his entirety.[43]

---

[40] Finney, *Musical Backgrounds for English Literature: 1580-1650*

[41] Marsilio Ficino, *Opera Omnia* (Basileae, 1576), 563 (*De Triplici Vita*, III., xxi) qtd. in D.P. Walker, *Spiritual and Demonic Magic: From Ficino to Campanella* (London: The Warburg Institute, University of London, 1958), 10.

[42] Walker, *Spiritual and Demonic Magic*, 8.

[43] Ficino, *Opera Omnia*, 1453 (*Commentary in Timaeus*, c. xxviii) qtd. in Walker, *Spiritual and Demonic Magic*, 9.

Ficino's belief that musical sound is made of refined air is at once a forward- and backward-looking assertion as it draws on a non-Aristotelian strand of acoustical theory dating back to the Middle Ages that regarded sound as subtle or fine air and simultaneously anticipates mechanistic accounts of sound by recognizing that it depends centrally on the movement of air.[44] Sound in *Comus* often exhibits the qualities Ficino gives it: likeness to air, likeness to spirit, and motility. Furthermore, elements of the masque that suggest music may be used for ill, to deceive, impair, or entice the listener, may be traced to Ficino's notion of musical sound as almost undoing the soul by infusing the spirits with its own movements.

I. "WITH PUISSANT WORDS, AND MURMURS": THE POWER OF INCANTATION

By framing the Lady's trial not only as a test of the will, but also as a challenge to her aural faculties (her ability to sing, trust her ear, speak out in her own defense, and then again, keep silent), Milton takes a Baconian view on the acoustical value of music, foregrounding the role that sound and experiments involving sound play in determining one's physical and moral position in the world. Understanding aural experience from a physical standpoint, as Bacon and others strove to do in the seventeenth century, is an aspiration that Milton shared. But even as it registers approval of this kind of experimental inquiry, Milton's masque is deeply guarded about the theory informing this

[44] On the tradition in acoustical literature that treats "sound as a material substance rather than an accident," and whose proponents include Priscian, Robert Grosseteste, and John of Salisbury, see Charles Burnett, "Sound and its Perception in the Middle Ages," 67-9.

early research and the potential misuses of acoustical artifice. As I mentioned earlier, these reservations grow out of the association of occultism with the history of acoustical explanation and musical experiment.

I do not wish to paint Milton as a skeptic who regarded magic as powerless to alter or manufacture sounds and affect the hearing of individuals. Nowhere in Milton's writings does he explicitly deny the efficacy of magic. His interpretation in *Areopagitica* (1644) of Acts 19:19, which describes Christian converts from Ephesus burning their magical books, balks at the idea of the state censoring such books, but nevertheless indicates that the practice of magic is a truly dangerous affair:

> As for the burning of those Ephesian books by St. Paul's converts, 'tis replied the books were magic—the Syriac so renders them. It was a private act, a voluntary act, and leaves us to a voluntary imitation: the men in remorse burnt those books which were their own; the magistrate by this example is not appointed; these men practiced the books; another might perhaps have read them in some sort usefully.[45]

Milton could have argued that the magistrate's interference is unnecessary in the case of magical books because they are harmless or ineffectual. But he makes no such comment. Far from being vacant tomes, the books have a capacity to incite magical practice that individuals may privately seek to eliminate by burning them; moreover, if the books are read without involving the reader in idolatry or commerce with evil spirits, they may

[45] John Milton, *The Complete Poetry and Essential Prose of John Milton*, eds. William Kerrigan, John Rumrich, and Stephen M. Fallon. (New York: The Modern Library, 2007), 938.

even be found to contain useful knowledge. St. Paul's interactions with the people of Ephesus, a flourishing center for magical belief in antiquity, would again attract Milton's notice as he wrote *Paradise Lost*. In Chapter 3 I argue that Paul's Epistle to the Ephesians, particularly its allusion to an evil prince of the air (a figure possibly invented by the writer of the Epistle to head up and stand collectively for the numerous spirit-deities to whom citizens of that city addressed their magical rites) lies behind Milton's depiction of Satan as a manipulator of the weather and sound. The passage from *Areopagitica* shows that the interaction of Christianity and pagan religions in Ephesus interested Milton from an early date. The scriptural verses he cites in that tract and in *Paradise Lost* (Eph. 2:2) exemplify how the early church defined idolatry with respect to the spirit world. Acts 19:19 in particular seems to offer Milton insight as to whether magic or knowledge of magic constitutes idolatrous worship or illicit contact with this numinous world. In light of the fact that in *Paradise Lost* he styles Satan after St. Paul's prince of the power of the air, we might imagine that Milton also had the magic of Ephesus in mind when he made Circe the mother of the villain in his masque and endowed him with supernatural and magical gifts.

The distinction Milton draws in *Areopagitica* between books used for magical practice and those mined for knowledge applies in *Comus* where the enchanter's spells are clearly regarded as illegitimate and deplorable examples of necromancy, but the shepherd lad's knowledge of a thousand simples represents an acceptable and valuable appropriation of magical lore. If we map the shepherd boy's knowledge of pharmacopeia and Comus's magical art onto divisions in occult philosophy, the former falls safely in

the realm of natural magic, the latter in the category of black magic or sorcery.[46] These types of magic recognize different sources of power: the natural magician locates it in the hidden virtues or occult properties of nature and the necromancer in the power of the Devil or evil spirits.[47] The shepherd lad's expertise clearly pertains to the "strange and vigorous faculties" inherent in nature; his studious familiarity with nature's occult properties, not the aid of a particular spirit, enables him to pluck out from his collection a root "of divine effect" for Thyrsis (628, 630).[48] As indicated earlier, sound and music were key subjects of natural magic, a quasi-scientific body of thought whose intellectual aims were not so different from those expressed in Milton's program of "universal learning" from *Prolusion VII*. Witness this definition of magic given by the natural magician Della Porta:

> I think that Magick is nothing else but the survey of the whole course of Nature. For, whilst we consider the Heavens, the Stars, the Elements, how they are moved, and how they are changed, by this means we find out the hidden secrecies

---

46 According to Giambattista della Porta's scheme, magic has two kinds: "the one is infamous, and unhappie, because it hath to do with foul spirits, and consists of Inchantments and wicked Curiosity; and this is called Sorcery; an art which all learned and good men detest; neither is it able to yield any truth of Reason or Nature, but stands merely upon fancies and imaginations, such as vanish presently away, and leave nothing behind them;…The other Magick is natural; which all excellent wise men do admit and embrace, and worship with great applause; neither is there any thing more highly esteemed, or better thought of, by men of learning"; *Natural magick* (London: printed for John Wright next to the sign of the Globe in Little-Britain, 1669), 1-2.

47 Shumaker explains, "traffic with […] unfriendly daemons was almost universally condemned as *goëtia*, or black magic. No matter what protestations of innocence might be made by the black magician, the consensus of informed opinion was that he entered into an implicit pact with the Devil, however unwittingly, just as the white witch or 'wise-woman' did. If so, he too was a witch. Usually, however, the witch made an explicit pact, agreeing to yield his soul ultimately to the Devil in exchange for extraordinary powers during his lifetime"; *The Occult Sciences*, 73.

48 John Milton, *Poems of Mr. John Milton* (London: printed by Ruth Raworth for Humphrey Moseley, 1645), 102-3. All quotations of Milton's poetry in this chapter are from this edition and henceforth are cited in the text by line number.

> of living creatures, of plants, of metals, and of their generation and corruption; so that this whole Science seems meerly to depend upon the view of Nature, as afterwards we shall see more at large.[49]

But some authors in the occult tradition were interested in sound as a way to facilitate ceremonial magic. This type of magic was more questionable than natural magic as it used incantations and other rites to invoke the aid of spirits or other intelligent influences. Ceremonial or spiritual magic supposedly allowed witches or black magicians to commune with bad daemons.

But it might also be employed to procure the influence of good spirits. The third section of Ficino's *De vita triplici* (1482-89), entitled *De vita coelitus comparanda*, exemplifies the latter kind of ceremonial magic because it proposes various "ways of attracting benevolent celestial influences—chiefly but not exclusively planetary—and repelling maleficent ones."[50] In the *De vita coelitus comparanda*, Ficino instructs the reader how to perfect the harmony between one's life and the stars' ruling influence by discovering which songs or tones belong to specific stars so they may imitate and address them to the right parts of the sky.[51] Agrippa affirms that words arranged in verses that properly conciliate the stars and their intelligences have a unique power to enchant:

> Such like verses being aptly, and duly made according to the rule of the Stars, and being full of signification, & meaning, and opportunely pronounced with vehement affection, […] and by the violence of imagination, do confer a very

---

[49] *Natural magick*, 2.
[50] Shumaker, *The Occult Sciences*, 121.
[51] Shumaker, *The Occult Sciences*, 132-33.

> great power in the inchanter, and sometimes transfer it upon the thing inchanted, to bind, and direct it to the same purpose for which the affections, and speeches of the inchanter are intended.[52]

He locates this power—following Ficino's description of music very closely—in the living, moving, spirit-like quality of the words, which have been infused with both human reason and celestial virtue:

> Now the instrument of the inchanters is a most pure harmoniacall spirit, warm, breathing, living, bringing with it motion, affection and signification, composed of its parts, endued with sence, and conceived by reason. By the quality therefore of this spirit, and by the Celestiall similitude thereof, […] verses also from the opportunity of time, receive from above most excellent vertues, and indeed more sublime, and efficacious then spirits, & vapors exhaling out of the Vegetable life, out of hearbs, roots, gums, aromaticall things, and fumes, and such like. And therefore Magicians inchanting things, are wont to blow, and breath up on them the words of the verse, or to breath in the virtue with the spirit, that so the whole virtue of the soul be directed to the thing inchanted, being disposed for the receiving the said vertue.[53]

Voiced sound, by Agrippa's account, amounts to far more than the mechanist idea of a motion of the air sensed by the ear and translated in the mind. It is comparable to vapors from plants and to perfumes, but consists of a higher, astral substance. When the words of

---

[52] Heinrich Cornelius Agrippa, *Three books of occult philosophy* (London: Printed by R.W. for Gregory Moule, 1651), I.156.
[53] Ibid.

an enchantment are pronounced, breathing in and blowing out transfers and infixes their virtue. Agrippa's alarming suggestion that words, because of their airy substance, may be mixed with celestial influence to work involuntary effects on the spirit, haunts Milton's poetry. By having the Lady and her brothers' confront the son of Circe, "Deep skill'd in all his mothers witcheries," in a dark forest where their powers of vision are greatly diminished Milton deliberately tackles this fear head on (512). The children's quandary raises questions about sound that interested contemporaries but by no means were satisfactorily understood, certainly from the perspective of modern science, but also from Milton's standpoint, that of moral philosophy and poetry. How reliably does sound inform the judgment? How strongly does it move the passions and through them the soul? How does one speak virtuously in a spiritually compromised, and thus, acoustically fragile environment?

II. The Hazardous Acoustics of "spungy ayr"

From the very beginning of *Comus*, the possibility that sound on Earth may not be communicated directly or faithfully from its source is raised. The problem lies with the medium of sound—the air. In the first lines of the masque, the Attendant Spirit complains about bad air quality, contrasting the "Regions milde of calm and serene Ayr" where he originated from with Earth's "smoak and stirr" (4-5). His "bright aëreal" nature is indisposed to "the rank vapours of this Sin-worn mould"—the fumes that course through the mortal body and the material world—but he suffers them in order to lend his special

aid to a just few on Earth (3, 17). The Lady echoes these sentiments when she opens her mouth to answer Comus's argument about the necessity of enjoying Nature's riches. She confesses that she "had not thought to have unlockt my lips / In this unhallow'd air," until realizing that virtue needed a champion (755-56).

If the Attendant Spirit and the Lady characterize the air and the vapors entering and exiting the body, as putrid and adverse to health, then the picture that emerges of the wild wood at evening is of a darkened, delusive atmosphere inimical to clear perception. The faculty of sight is practically useless in this setting. The "blind mazes" of wood are inscrutable to the eye, and the night is so dark that the Lady exclaims

> O theevish Night
> Why shouldst thou, but for som fellonious end,
> In thy dark lantern thus close up the Stars,
> That nature hung in Heav'n.
>
> (194-97)

Her remark is echoed by the older of her two brothers, whose prayer for starlight points up the thickness of the forest canopy and the pitchy blackness of the night:

> Unmuffle ye faintstars, and thou fair Moon
> That wontst to love the travailers benizon,
> Stoop thy pale visage through an amber cloud,
> And disinherit *Chaos*, that raigns here
> In double night of darknes, and of shades;
>
> (330-4)

Lack of light impels the wanderers to lean more heavily on their sense of hearing for guidance. The Lady expresses this inevitability as she tries to locate those who are responsible for making the sounds of merriment she hears issuing from the wood: "This way the noise was, if mine ear be true, / *My best guide now*" (169-70; italics added). The Attendant Spirit in the person of Thyrsis also uses his ear to locate the Lady: "Then down the Lawns I ran with headlong hast / Through paths, and turnings oft'n trod by day, / Till *guided by mine ear* I found the place" (567-9; italics added). Eyes have been rendered useless by darkness.

By depicting the wood that separates the children as stubbornly tangled and wrapped in impenetrable darkness, the masque raises the possibility that sound and hearing will help to unite them. In response to his older sibling's improbable suggestion that they might see "some gentle taper / Though a rush Candle from the wicker hole / Of som clay habitation" (336-8), the younger brother expresses doubt about gaining visibility in the wood, hoping, rather, that sound might reach their ears:

> Or if our eyes
> Be barr'd that happiness, might we but hear
> The folded flocks pen'd in their watled cotes,
> Or sound of pastoral reed with oaten stops,
> Or whistle from the Lodge, or village cock
> Count the night watches to his feathery Dames,
> T'would be som solace yet, som little chearing
> In this close dungeon of innumerous bowes.

(342-8)

All of the opportunities he imagines for aural perception are plausible—from the noises of farm animals to the sounds of the shepherds and villagers. And indeed, it is Thyrsis's far away "hallow" that finally rescues them from complete darkness, literal and metaphorical (480).

But even if aural phenomena seem to offer consolation to the children, and a way to find their bearings in the dark woods, the masque shatters these assumptions by illustrating how sound can mislead and even infect the mind. Comus's opening song and the aural and visual illusions he presents to the Lady demonstrate that sound cannot replace light in its absence; nor can it alleviate entirely the sense of misdirection or "*Chaos*, that raigns" at night. Certain sounds are actually distorted by the night air, others suspended and preserved by it. Darkness and thick air present a biding place for sound where it lingers and sometimes transmutes even after its source has been removed.

The synesthetic language Comus uses to describe how the shadiness of the wood conceals his followers' illicit acts introduces the idea that darkness may serve to trap or retain sound, whereas light readily releases it. When he bids his fellow revelers to begin their sacred rights, he reassures them that "Tis onely day-light that makes Sin / Which these dun shades will ne're report" (126-7). He continues to conflate speech with illumination when he promises the goddess Cotytto that they will complete all her rites

Ere the blabbing Eastern scout,
The nice Morn on th'*Indian* steep
From her cabin'd loop hole peep,

And to the tel-tale Sun discry

Our conceal'd Solemnity.

(138-42)

When the Lady arrives at the place where she thought she heard riotous sounds, darkness seems to act as Comus suggests, mysteriously absorbing any trace of the sounds' origins:

This is the place, as well as I may guess,

Whence eev'n now the tumult of loud Mirth

Was rife, and perfet in my list'ning ear,

Yet nought but single darkness do I find.

(200-203)

But the Lady's words "eev'n now," which indicate that the ruckus she heard is *still* perceptible, present a point of confusion since they are succeeded by the words "Was rife," which suggest conversely that the sound is no longer distinct. Is she still hearing the sounds that Comus hushed up just before she arrived? Possibly. The phenomenon of sound delay had been discussed by Bacon who knew that sound traveled slower than light and even proposed a way to measure its speed.[54] In *Sylva Sylvarum*, he observes that the "species of audibles do hang longer in the air than those of visibles."[55] The persistence of sound after it is created may relate to the thickness of the medium and the time of day. He explains, "in the day, when the air is more thin, no doubt, the sound pierceth better; but

[54] Bacon, *Sylva Sylvarum*, 416, III, §209. Bacon's idea for measuring the speed of sound was adapted by Mersenne and others; see Gouk, *Music Science and Natural Magic*, 162.

[55] Century II of the *Sylva Sylvarum* includes an entire section (experiments 124-137) on "Experiments in consort touching production, conservation, and delation of sounds; and the office of the air therein"; see pp. 393-8. Bacon's claim about the persistence of audible species in the air may be found on p. 432, III, §274.

when the air is more thick, as in the night, the sound spendeth and spreadeth abroad less"; "thick air preserveth the sound better from waste."[56] These accounts of the persistent nature of sound, particularly at night, help us to see why the clamor of Comus's party is still audible to the Lady even when the partiers have vanished and ceased to make noise. Already inclined to lag and linger in the air, the species of sound is further preserved from dissipation by the insulating material of darkness. That the Lady switches to past tense ("the tumult…/Was rife") as she narrates her experience, however, suggests that either the sound eventually falters or the Lady loses confidence in what she hears. The behavior of aural stimuli—the fact that they hang around in the air even when their producers no longer remain—imposes a disruption between sound and sight, possibly causing the Lady to doubt her ear, which she previously presumed was her "best guide."

Milton is not content, however, to admonish us of the disorienting physical properties of sound as delineated by Bacon. He seems to discern even greater danger in certain characteristics of sound that Bacon is happy to describe from a physical standpoint without discussing their moral or spiritual implications. Throughout his natural philosophy, Bacon is at pains to distinguish his method from a certain fraudulent sort of natural magic that he believes acts on men's critical faculties like a drug because it rests on opinions and mystical truths rather than the active and rational pursuit of real knowledge.[57] Perhaps because of his contempt for this delusive kind of magic, which he views as an aberration from the original conception of magic, Bacon avoids speculation

[56] Bacon, *Sylva Sylvarum,* pp. 399, 418, §143, §218.
[57] *Of the Dignity and Advancement of Learning*, III, Ch. 5, p. 367.

about the interaction of sounds with astral or spiritual influences, which, as we have already seen, interested occult philosophers. In *Comus*, Milton goes beyond Bacon's contentions that sound is not communicated instantly, that it lingers in the air, and that dark and dense air is effective for retaining sound, in implying that the substance of sound implicit in the air is susceptible to spiritual influence and manipulation—particularly by magical means. In recognizing the potential for spiritual agents or meddling magicians to interfere with sound, Milton, who in many other respects accepts Bacon's acoustics, advances arguably a less naïve model of sound by revealing how even a physical account of aural phenomena like Bacon's is compatible with the operation of magical and supernatural forces. Bacon simply does not acknowledge that by giving sound a life outside the ear in the mysterious immaterial vehicle of the species, and, by allowing this entity to pass into the body and work on the spirit, he invites the notion that the species—and through it, the human soul—may be altered or corrupted by spiritual means.

Milton is much more willing to entertain the notion that aural phenomena, while explicable through natural laws, are also subject to magic, which, as a science, furnishes useful ways of explaining sound, and as an art, is capable of affecting and diverting sounds to serve the magician's purposes. That magic is afforded this power in the masque, particularly the power to draw out or exploit certain properties inherent in the environment, is evident from Comus's ability to channel corrupted sounds into the Lady's mind. This occurs just as the Lady seems to indicate that the sound, whose producers she wandered in search of, has subsided. At this point the invisible residue of

that commotion "[throngs] into [her] memory" confronting her with "calling shapes, and beckning shadows dire, / And airy tongues, that syllable mens names" (205-207). These phantom voices are not merely reverberations of the sounds the Lady heard earlier; they have been transformed into phantasms that conduct themselves into the Lady's mind where they call and beckon to her as though of their own agency. How did the sound she originally heard transform from "Midnight shout, and revelry" into the sinister whispers of "airy tongues" (103)?

The seeds of the enchantment may be traced to Comus's invocation of Cotytto, "Goddesse of Nocturnal sport" (128), which he plies just before the Lady's footsteps are perceived nearby. In addressing the deity, Comus stresses that this conjuration always occurs at the darkest point of night:

> mysterious Dame
> That ne're art call'd, but when the Dragon woom
> Of Stygian darkness spets her thickest gloom,
> And makes one blot of all the ayr
>
> (130-3)

Comus's rather disgusting figure of a Hell monster's womb spitting out a thick cloud of darkness is not just the macabre expression of a lascivious sorcerer; it displays his continual desire for the protection of darkness and anticipates his request for additional cloud cover. In the next line he begs Cotytto to

> Stay thy cloudy Ebon chair,
> Wherin thou rid'st with *Hecat'*, and befriend

Us thy vow'd Priests.

(134-6)

The elder brother's speculation that the stellar and lunar influence he seeks to light the way back to his sister may "be quite damm'd up / With black usurping mists" seems to be in response to this dark, obscuring fog, which Comus has invited to settle over the wood (335-6). The fact that it blocks the starlight from reaching the children is no accident. As the Lady rightly suspects, the night has eclipsed the stars "for som fellonious end." That is to say, the fog Comus summons from the Thracian deity and her associate Hecate, goddess of sorcery, is clearly imbued with all the physical hazards of a dark haze—including the capacity to amplify, prolong, and preserve sounds as Bacon suggests—but also, the threatening enchantments of black magic.

Comus uses other magical means to increase the already bewildering nature of nighttime haze. In his opening speech, which precedes a lively song, he brags with Cavalierish pomp, "We that are of purer fire / Imitate the Starry Quire" (111-2). As Blair Hoxby argues, the rite Comus initiates here illustrates a key function of balletic dance in Stuart masques: the magic conferral of astral influence on the masquers via their figural imitation of stellar movements.[58] Comus appears to subscribe to Ficino's view that through song we imitate and channel astral influence most effectively.[59] In addition to

---

[58] "The Wisdom of Their Feet: Meaningful Dance in Milton and the Stuart Masque," *English Literary Renaissance* 37 (2007): 88-90.

[59] "Song is the most powerful of all imitations because it reflects the intentions and moods of the spirit and stirs up those who hear it. Harmony is purer than matter and more like the sky than medicine, for it is warm, breathing air and, in a way, alive, composed of articulations and joints (*articulationibus artubusque*) like an animal, and possessed of a feeling and significance to which the sky will respond, as will the singer himself, especially if his nature is Phoebean (Apollo being the god of song)." See *De vita triplici* in *Opera*,

attempting with his antic measure to infuse his crew with celestial power, Comus further alters the atmosphere of the wood by seeding it with magical spells or charms. As he hears the Lady approaching, Comus tosses "dazzling Spells into the spungy ayr / Of power to cheat the eye with blear illusion" and cover up the remnants of his crew's revelry (154-5). I argue that these spells, which Comus casts aloft with a certain "Magick dust," do more than interfere with the enchanter's outward appearance and that of the dark forest (165). That they are visually effective is evident from the success of Comus's shepherd disguise and the Lady's conviction that the "sable cloud" overhead "[Turns] forth her silver lining on the night"—quite possibly the result of the magic Comus has performed on the air (222-3). But they also carry aural implications, as magical verses themselves, Agrippa says, are made of "a most pure harmoniacall spirit, warm, breathing, living, bringing with it motion, affection and signification." Moreover, Comus tells us that his spells have been absorbed into the "spungy air," the medium through which all the other sounds in the vicinity have moved or will move. Milton's word choice here is significant. By likening the dense atmosphere of the wood to a sponge, he emphasizes its power to absorb and retain Comus's spells and the sounds of his revelers. Whether these suspended sounds consist of species, as Bacon would have it, or refined and moving air, as Ficino believed, they are compromised by the spells that are also stuck in the enchanted fog. Responsible for the moment when the revelers' tumult ceases to ring "eev'n now" in the Lady's ear and beckoning voices begin to flow into her imagination

---

vol. 1 (Basiliae: Ex Officinia Henricpetrina, 1576) III, xviii (558), paraphrased in Shumaker, *The Occult Sciences in the Renaissance*, 133.

are the astrologically empowered spells and "black usurping mists" that Comus uses to accentuate the natural acoustics of dark air.

The air, for Comus, is a place of spiritual potential. It is a region full of animate spirit, celestial and daemonic, which the enchanter may constrain and divert for his purposes. The spirituous substance of sound is a crucial vehicle for inviting disembodied spirit into objects, persons, or locales, and similarly, for releasing it from them. Comus is well aware of the utility of sound as an instrument of enchantment and uses it to degrade and deplete his victims' spirits as well as harvest spirit from the environment. His belief that the air is saturated with spirit that is responsive to sound is evident not only from his tuneful invocation of the stars and the goddesses of the night, but also his curiously tactile descriptions of the silent night air. When he overhears the "raptures" that the Lady sings to Echo he remarks

> How sweetly did they float upon the wings
> Of silence, through the empty-vaulted night
> At every fall smoothing the Raven doune
> Of darknes till it smil'd
>
> (246, 248-51)

He says the night is vacuous or "empty-vaulted," but characterizes its negative qualities in material terms: silence has wings; darkness is downy. This contradiction recalls the paradoxical image in *Paradise Lost* likening Hell to a furnace whose flames emit "No

light, but rather darkness visible."[60] Though a better term for the oblivion in Milton's masque might be "darkness palpable," the underlying meaning is similar. There is no light; nevertheless the darkness is crammed with perceptible activity. Here that active presence is registered by beating wings and raven feathers, which are stilled or coaxed into ordered movements by the caresses of the Lady's voice. Comus alludes again to the feathered texture of the sky in his argument against virginity when he claims that if Nature's sons were to refuse her gifts the whole earth would be strangled with her fertility and "the wing'd air dark't with plumes" (729). On its face, this statement is a simple prediction that the Earth's bird population would explode, but it also conjures an image of a dark pall of wings in the sky. That Comus professes to fear an atmospheric eclipse is ironic, since he is the chief beneficiary of obscuring shade and darkness. Moreover, if the Elder Brother imagines correctly, the sorcerer should be accustomed to being encircled by winged creatures (along with other demons) as he commands armies of "*Harpyies* and *Hydra'*s, or all the monstrous forms / Twixt Africa, and Inde" (604-5). By portraying the crowding of the sky with such forms as a calamitous outcome of self-denial, Comus seems to admit—however insincerely—that the benighted existence he leads in the wood enshrouded by tree boughs, magical fog, and the rustle of spiritual wings, is truly a kind of suffocating hell.

Comus displays awareness of his faults most apparently when he hears the Lady sing or speak. The divine quality of her voice strikes him as serving a dramatically

[60] In this chapter, I use the revised and augmented 2nd edition, which hereafter is cited in the text by book and line number; John Milton, *Paradise Lost. A Poem in Twelve Books* (London: 1674), p. 4, Bk. 1, l. 63.

different purpose from that for which he employs sound. Upon hearing her sing, he takes her for an exotic creature, or else,

> the Goddes that in rurall shrine
> Dwell'st here with *Pan*, or *Silvan*, by blest Song
> Forbidding every bleak unkindly Fog
> To touch the prosperous growth of this tall Wood.
>
> (266-9)

It seems that Comus does not have a particular goddess in mind; rather, amazed with the Lady's voice, he invents what he thinks is a worthy identity for her, one that reflects her powerful vocal capabilities. Notably, the genius he describes uses her "blest Song" to chase away unfriendly fog, the very meteorological phenomenon he has just invited Cotytto to cast over the woods. Comus's comment reflects his real concern that the Lady's divine voice will disperse the mists he has drawn as a curtain around his nest of sin. His intuition echoes a view held by some at the time that sacred music has the power to ward off evil spirits. In his *Principles of musik, in singing and setting* (1636) Charles Butler designates casting out the devil and calming the possessed as "Extraordinari" uses of divine music, citing the curative effects of David's harp on the troubled Saul as well as Luther's belief that "[this] power of Musik against evil spirits…stil remain" in the modern era.[61] Milton's notion of music working on behalf of virtue, however, is more

[61] *The principles of musik, in singing and setting:vvith the two-fold use thereof* (London: Printed by J. Haviland, for the author, 1636), II.II, §IV, pp. 114-5. Special thanks to The Newberry Library for allowing me to access this first edition.

complex than Butler and Comus would have it. When the musical and verbal parts of a song reinforce each other—the words receiving virtue from the sound of music and music benefiting from the meaning of words—it can possess a universal appeal. Unlike a virtuous plant such as Haemony, whose occult properties give it an antipathy to some objects and sympathy to others, divinely inspired sound, like Orphic music, holds sway over all who hear it, bringing them to life and drawing them towards good. The universally attractive power of divine song explains why Comus—himself a depraved agent of evil—is allured by the sound of the Lady's music ("such Divine inchanting ravishment") despite voicing the common superstition that "blest Song" can ward off evil (244).

If Comus and the Lady are both empowered by acoustics, but the Lady's words are "set off by som superior power," namely Virginity, why doesn't the masque culminate with the Lady triumphing over Comus with her verbal talents (800)? An oratorical victory would seem to illustrate the ineffectualness of Comus's "well plac't" and "baited" words against the Lady's divinely guided sounds (161-2). But Milton is not interested in proving that sound can be a more powerful instrument in the hands of the good versus evil. We are asked to take this on faith when the Lady promises Comus that, should she choose to speak, her true cause "would kindle [her] rap't spirits / To such a flame of sacred vehemence, / That dumb things would be mov'd to sympathize" (793-5). Rather, *Comus* is invested in the question of whether and how sound may be used in a way that conserves and even enlarges spirit.

III. "NOT A WASTE OR NEEDLESS SOUND": THE AURAL ECONOMY OF SPIRIT

The Lady's final pronouncement, which causes Comus to break out in a cold sweat, highlights the central role that spirits play for Milton in the transmission of sound. Comus's physiological response to her claim that the "brute Earth," will move sympathetically to the vibration of her "rap't spirits," completes a chain reaction initiated by the sound of the Lady's voice (793-802). This moment recalls the phenomenon of sympathetic resonance (discussed above) that Bacon and others before him observed in the responsive behavior of musical instruments.[62] As one lute string transfers its motion to a similarly tuned string on another instrument, the Lady imagines that her divinely attuned voice, through its harmony with the Earth, could inspire it to shake and crumble over her assailant's "false head" (798). A mechanical explanation for the process of sympathetic resonance was unknown at the time *Comus* was written. But a theory of the *spiritus* like Bacon's could explain how sound causes responsive motion in non-living, "dumb things." He believed that "inanimate bodies respond to sound and resonate or produce echoes because the species of sound mingles with the pneumatical part of the body, its *spiritus.*"[63] Had Milton fully subscribed to this notion of resonance and used it to describe the operation of the Lady's voice, he might have deemed it safe for her to say her piece and "unfold the sage / And serious doctrine of Virginity" (786-7). While the

[62] Bacon's discussion of this phenomenon occurs in Century III of the *Sylva Sylvarum*, p. 433, §279. Gouk finds precedents for Bacon's description of sympathetic resonance in Henry Peacham's *Compleat Gentleman* (1622) and Porta's *Magia naturalis*; see *Music, Science and Natural Magic*, 169.
[63] Gouk, "Music in Francis Bacon's Natural Philosophy," 141.

objects receiving sound in Bacon's account suffer an involuntary response, the sound maker undergoes no unusual effects.[64] But Milton seems to think that the act of speaking also involves an outlay of spirits on the sound maker's part, the loss of which the Lady is unwilling to suffer for the pacification of a hopelessly depraved soul like Comus. Her allusion to the phenomenon of spiritual rapture, which can involve the departure of the spirit from the body, corresponds to other moments in the masque where sound is associated with spiritual dislocation. As we shall see, the possibility that aural experience may deplete the body of its spirits—along with the fear that they may be corrupted—is a major concern for speakers and listeners in Milton's masque, shaping their decisions about when to speak and listen attentively.

The first indication that bodily spirit is a limited resource in *Comus* appears in the Lady's statement that, though she does not have the strength to yell for her brothers, she will try to sing loudly to them because her "new enliv'nd spirits / Prompt [her]" (227-8). Prior to feeling emboldened, her spirits were endangered by Comus's enchantments, which succeeded in startling her thoughts, though they intended much worse—to "astound" or freeze her mind (210). At last her spirits are "new enliv'nd," saved from the brink of astonishment by her conscience, which re-minds her (quite literally) of her heavenly champions (Faith, Hope, and Chastity). The association of lively spirits with the ability to cast one's voice so it may "be heard farthest" demonstrates that bodily spirit is a wellspring of vocal force and implies that paucity of spirit, by the same token, may

[64] All matter, according to Bacon, contains *spiritus* that enables it to perceive; see Gouk, "Music in Francis Bacon's Natural Philosophy," 141.

jeopardize the voice (226). In light of Ficino's highly influential account of musical sound as elementally similar to the *spiritus*, we may construe the Lady's voice as an emanation of her spirits. The idea that speaking volubly was a physically depleting activity was anticipated in classical philosophy. Lucretius contends, for example, that in speaking we actually give up a part of our selves:

> …it does not escape you how much body is taken away and drawn off from men's very sinews and strength by speech continued without pause from the glimmer of rising dawn to the shades of dark night, above all if it is poured out with loud shouting. And so the voice must needs be of bodily form, since one who speaks loses a part from his body.[65]

Even graver than loss of body, though related to it, is spiritual exhaustion, the consequence in *Comus* of over-extending oneself in song or speech.

When the Attendant Spirit advises the Lady after she has been freed from her paralysis, "Not a waste or needless sound/ Till we com to holier ground," he alludes to the fact that speaking could deprive her of spirit as well as the possibility that making sound in the haunted forest invites predation (941-2). Earlier, when he heard the Lady's song wafting above the wood, he was alarmed at how "neer the deadly snare" she sang (565). But in the larger scheme of the masque, the threat of detection that sound brings with it is a lower concern than its power to move and expend the spirits, if only because detection is sometimes desirable. While the Lady's voice initially attracts Comus's

---

[65] Titus Carus Lucretius, *On the Nature of Things*, translated by Cyril Bailey (Oxford: Clarendon Press, 1921), Bk. IV, ll. 522-49, p. 161.

notice, it also plays a role in helping the Attendant Spirit track her down: "guided by mine ear I found the place" (569). The possibility that sound has an evacuating effect on the body's spirits casts a darker shadow of doubt on the children's agency. Comus's recollection of his mother's relationship to music illustrates the danger sound can pose to the spirit by supplanting its functions and even its substance:

> I have oft heard
> My Mother *Circe* with the Sirens three,
> Amidst the flowry-kirtl'd *Naiades*
> Culling their Potent hearbs, and balefull drugs,
> Who as they sung, would take the prison'd soul,
> And lap it in *Elysium*, *Scylla* wept,
> And chid her barking waves into attention,
> And fell *Charybdis* murmur'd soft applause:
> Yet they in pleasing slumber lull'd the sense,
> And in sweet madnes rob'd it of it self.
>
> (251-60)

These Homeric singers do nothing to liberate the "prison'd soul," though their potion-like song surrounds it with heavenly sensation. Comus describes their bewitching music with images that are heavy and liquid in contrast to the aerial terms that the Attendant Spirit applies to the Lady's song, "a soft and solemn breathing sound /… like a steam of rich distill'd Perfumes" (554-5). Circe's music puts the sense to sleep, much as the frivolous sort of natural magic causes men's understanding to slumber according to Bacon. The

parallels between Milton's account of the sorceresses' song and Bacon's indictment of false magic are quite striking. Here is the passage from Bacon with added italics:

> But this popular and degenerate natural magic has the same kind of effect on men as *some soporific drugs, which not only lull to sleep, but also during sleep instill gentle and pleasing dreams*. For first *it lays the understanding asleep by singing* of specific properties and hidden virtues, *sent as from heaven* and only to be learned from the whispers of tradition; which makes men *no longer alive and awake* from the pursuit and inquiry of real causes, but to rest content with these slothful and credulous opinions; and then *it insinuates innumerable fictions, pleasant to the mind*, and such as one would most desire, —like so many dreams.[66]

Interestingly, Bacon employs the figure of song in this analogy as one of the vehicles whereby magic lulls the mind into a complacent sleep, though he is careful to exclude from his discussion of acoustics in the *Sylva Sylvarum* explicit mention of the magical uses or properties of sound. In this passage, Bacon caricatures the actual instruments of magic—sleep-inducing drugs, music, whispered words, and manufactured dreams—stripping them of any mystical potency and portraying them as a smokescreen for the truly stupefying logic of the magical tradition, which rests on received opinion. Milton certainly shares Bacon's scorn for the deception definitive of certain kinds of magic, but he is not so quick to deny that their instruments (music, drugs, and spells) can affect the spirits. In Comus's speech, Milton openly recognizes the kinship between magic and

---

[66] *Of the Dignity and Advancement of Learning*, III, Ch. 5, p. 367.

music, showing how in practice song can effectively execute the ends of sorcery. Music is not simply a metaphor for magic in *Comus*; it can serve as a real, subtle, and insidious means of performing magical enchantment.

How exactly does it entrance the listener? It is not just with drowsiness that Circean music overcomes the sensitive faculties. The sirens' singing also instills a "sweet madness," that robs the sense "of it self." Madness, here, refers to the notion of ecstasy or rapture—the separation of the soul from the body initiated by a ravishing experience.[67] Music can trigger ecstasy, which was often construed as a means of gaining prophetic insight or closeness to God. Although it is not entirely clear what Milton means by "sense" in this passage, in the context of rapture we may presume that he is speaking about the lower, irrational soul—what we have been calling the *spiritus*—or, more specifically, the animal spirits of medical theory, which were thought to control sense perception and the imagination among other things.[68] According to a long tradition, developed by the Neoplatonists, dealing with the spiritual container of the soul and its potential to detach itself in ecstasy, man could have divinatory dreams and commune with spirits and demons when his *spiritus phantasticus* or imagination left his body in rapture.[69] In such a dream-state, "the soul has revelations…because it is no longer

---

[67] The madness Milton had in mind may have pertained to divinations of priests from Thracian or Phrygian religions and the cults of Cybele and Dionysus. "In these rites the participant was inspired by music and by dance to a religious frenzy in which he was possessed by the god or carried beyond himself"; see Finney, *Musical Backgrounds*, 51.

[68] For a summary of the functions of animal spirits see D. P. Walker, "The Astral Body in Renaissance Medicine," *Journal of the Warburg and Courtauld Institutes* 21 (1958), 120.

[69] Plotinus, Porphyry, Proclus, and Macrobius established a link between the *spiritus*, the soul's vehicle or container, and its divine origination and descent through the planetary spheres. Imagination is often construed as the "subtle body" that carries the soul out of the earthly body; see Robert Klein, "Spirito

hindered by the corporeal senses—'a pilgrim from the flesh'….[T]he silence of the external senses allows the imagination…to be moved by superior or divine agents."[70] This impairment of the corporeal senses by the departure of the soul is likely the kind of spiritual displacement to which Comus alludes when he talks about his mother's music robbing the sense "of it self." Circe's song, whose power may be strengthened by her magical drugs, reduces the listener's senses by extracting the sense-giving spirit from them in a "sweet" but irrational act of larceny. In order to glut themselves of the sound, the senses surrender the body's spirit and therefore their capacity to perceive. The "guilefull spells" Comus uses "To inveigle and invite th'unwary sense" of travelers stranded in the forest also employ Circe's method, "invit[ing]" the sense out of itself by beguiling it (536-7).

The Lady's song also has a similar unselving effect, not on the senses, but on the atmosphere. The Attendant Spirit reports, using the same language of larceny, that the her voice

> stole upon the Air, that even Silence
> Was took e're she was ware, and wish't she might
> Deny her nature, and be never more
> Still to be so displac't.
>
> (556-9)

Peregrino," in *Form and Meaning: Essays on the Renaissance and Modern Art*, translated by Madeline Jay and Leon Wieseltier (New York: Viking Press), 62-66.

[70] Klein quotes from Dante's *Purgatory*, IX, 16-18, in the *Divine Comedy* (translated by Charles Singleton [Princeton, N. J., 1970-75]); see "Spirito Peregrino," 63.

As we have seen, the silent night serves Comus's purposes, not by extinguishing the sounds and sights that might disturb the Lady, but by muffling and concealing them in its feathery thickness. The spiritual nature of sound (its incorporeality for Bacon) allows it to hang in the "spungy ayr" without being dispersed and to intermingle with the spells and enchantments that Comus has lodged there. Air, then, is appropriated by and dedicated to evil especially as it is disposed in the cloudy, dark wood of *Comus*. In reclaiming the air, the Lady's song engages it much as Circe's music approaches the sense, catching it unawares. But this process is depicted as an act of liberation rather than one of enslavement, which is the goal of Circean acoustics. The Lady displaces the silent air with a beautiful and wholesome sound rather than leaving it empty. She helps it cast off its enforced silence and become the "vocal air" once again (246).

The effect that divine acoustics has on perceivers is antithetical to that of Circe and Comus's sounds. Rather than depleting the listener of spirit and dulling his/her senses, divine sounds infuse the body with both spirit and sound—the two being virtually identical when the sound is harmonious—sharpening the listener's senses and fortifying them with the perspicacity of Heaven. The stark contrast between Comus's emotional response to the Lady's singing and the state of ecstasy associated with his mother's music may be seen, for instance, in his comment that he has never heard "such a sacred, and home-felt delight, / such sober certainty of waking blis" as the sound of the Lady's voice (261-2). As opposed to being carried out of his senses, he is certain that he is awake and sober, not floating above his body in an ecstatic trance or dream; the delight the Lady's voice inspires is "home-felt," i.e. it is sensed by the body. In recalling his initial reaction

to hearing the Lady's song, the Attendant Spirit affirms that divine sound enlarges rather than depletes the spirit. His sense of hearing grows under the influence of her music to the point where his whole being consists in aurality. "I was all eare," he tells the brothers, "And took in strains that might create a soul / Under the ribs of Death" (559-61). The extreme augmentation of his aural faculties seems a consequence of the fact that he "took in strains" that replenish his spirit and are capable, even, of creating a soul (as Orpheus succeeded in doing in Hades, the most lifeless of audiences). Here, Milton appears to follow Ficino, who advises that music is the best way to nourish the spirit, which, he thinks, gets worn out and consumed by mental and bodily activity.[71] Milton also anticipates his own depiction in *Paradise Lost* of angelic spirits, who may choose to live "All Heart…, all Head, all Eye, all Eare, / All Intellect, all Sense" as they please (6.350-1). To become "all Sense," then, would seem to be nothing like the fate suffered by Comus's victims, who "roule with pleasure in a sensual stie" (72). Comus and his rout seek pleasurable sensation *outside* of the body, in odors, wine, sweets, starry influence, dance, and games—objects and actions that, when wrongly used, dazzle without invigorating the spirit, much as Comus's spells "cheat the eye" of the truth, giving it less than it deserves (155).

If "Carnal sensuality" is the fleshly body's enjoyment of that which deludes the mind and deprives the spirit, then perfect sensibility is the fruit of a robust spirit, whose

[71] Ficino, *De Triplici Vita*, II, ixv, in *Opera Omnia* (Basileae, 1576), 523, quoted in Walker, *Spiritual and Demonic Magic*, 5.

telos is to be uninterrupted by flesh (474). When someone is found to be truly chaste, as the elder brother explains,

> A thousand liveried Angels lacky her,
> Driving far off each thing of sin and guilt,
> And in cleer dream, and solemn vision
> Tell her of things no gross ear can hear,
> Till oft convers with heav'nly habitants
> Begin to cast a beam on th'outward shape,
> The unpolluted temple of the mind,
> And turns it by degrees to the souls essence,
> Till all be made immortal.
>
> (455-63)

For Milton, it is chiefly aural sensation that initiates the transformation of the soul. If the ear is spiritual not "gross"—if it is guarded against sounds that will undermine its very functioning—it can be the gateway to higher understanding and immortality. The chaste soul, according to the passage, possesses a spiritual body similar to that of the Attendant Spirit as his hearkens to the Lady's voice and becomes "all eare." Like the extraordinary men in the Prolusions, whose surpassing learning gave them souls able to hear the music of the spheres and converse with the gods, *this* soul through "oft converse with heav'nly habitants" gains the aural capaciousness of a spirit. By perceiving exquisitely beautiful sound, a mortal becomes all spirit—a spirit, all ear.

The Lady takes up Milton's implied comparison between the soul and the organ of hearing when she refuses to explain to Comus the doctrine of virginity. She wants to defend the power of chastity, but stops and earnestly considers what would come of this. Speaking to Comus (but also thinking aloud to herself) the Lady reasons

> Thou hast nor Eare, nor Soul to apprehend
> The sublime notion, and high mystery
> That must be utter'd to unfold the sage
> And serious doctrine of Virginity,
> And thou art worthy that thou shouldst not know
> More happiness then this thy present lot.
> […]
> Thou are not fit to hear thy self convinc't.
>
> (784-92)

The Lady insists that Comus has "nor Eare, nor Soul" not in order to distinguish these terms, but to emphasize that both are required for and mutually engaged in the act of hearing. Comus's soul has grown "clotted by contagion," "imbod[ied]" and "imbrut[ed]," such that he has lost the spiritual part of himself that allows him to hear (467-8). We are reminded of Bacon's doctrine that "the pneumatical part, which is in all tangible bodies, and hath some affinity with the air, performeth in some degree the parts of the air" as a conductor and medium of sound.[72] The Lady's words will not resonate well with Comus as he is low on these pneumatical spirits, which are integral to acoustical conduction.

[72] Bacon, *Sylva Sylvarum*, II, § 136, p. 397.

While the first part of the Lady's argument holds it futile to educate Comus, her next point backtracks a bit, imagining that somehow the sound of her voice may get through to him anyway. She worries that he will literally "hear [himself] convinc't." Just by being in earshot of her divinely sanctioned voice, even without understanding it, a bystander like Comus might find himself convinced by its sound and transformed by an infusion of irresistible spirit. The Lady decides that Comus is not worthy of this gift and that she should like him to stay abject and deaf. Speaking, after all, takes effort and depletes one's precious store of spiritual wherewithal.

Temperance, the ethic that the Lady argues should govern how man appropriates Nature, influences her decision-making about speaking and listening in the masque. In an effort to preserve her spiritual core, her ears are "unattending" when they meet with flattery (Comus's breath is "ill…lost" on her) and her lips sealed when her audience is unworthy (272-3). On the other hand, Comus's acoustical behavior is guided by greed. In addition to exploiting natural law, he employs astral and demonic magic to manufacture and alter sounds that will help him rob the senses of his victims and amass more spirit for himself. *Comus* sheds light on one of the thornier problems in the early study of sound. To its theorists, sound seemed in many regards a physically regular phenomenon susceptible to human control, as in the case of musical instruments; but they also knew that it possesses uniquely affective qualities, which lent it the semblance of something spiritual. Without trying to reconcile these aspects of sound, Milton embraces and displays both its physical and spiritual components in his masque by severely limiting its representation of human experience to its aural features, forcing the children to use their

ears in spiritually and empirically meaningful ways. By incorporating both the mundanely physical and numinous aspects of sound into his masque, Milton recalls the magical heritage of acoustics in which vitalist explanations played a key role. In particular, the Ficinian analogy between musical sound and the *spiritus* strongly informs Milton's conceptions of the voice as a facet of the soul and sound as a potential tool for drawing spirit in and out individuals and the environment. On the other hand, the sheer number of acoustical phenomena Milton represents in *Comus*—echo, repartee, invocation, musical sympathy, bellowing, whistling, piping, and more—betrays his interest in Bacon's vast program of experiments in sound. The fusion of these magical and experimental intellectual influences in *Comus* shapes its representation of the Lady as an example of proper acoustical conduct. Her faith in her powers of perception and the carriage of the voice leads her to analyze what she hears and make her own "noise" in an attempt to locate her brothers; but her occasional silences and inattentive conduct towards Comus demonstrate wisdom about the penetrating, mutable, and despoiling potentialities of sound (227). These numinous properties of sound are well-attested, if not encouraged, by the literature of the occult, whose teachings about acoustics readers of *Comus* should not dismiss.

Chapter 3: The Power of the Air in Milton's Epic Poetry

Of all the hazards of fallen existence represented in *Paradise Lost*, the air poses the most pressing threat to life. Its potential antipathy prompts the Son's first compassionate act after judging Adam and Eve: "[T]hen pitying how they stood / Before him naked to the air, that now/ Must suffer change…he clad / Their nakedness."[1] Adam soon realizes that this divinely provided and mysteriously symbolic clothing, though it shows the way, is not sufficient cover to protect them from the elements (*PL*, 10.219-23). So pitiless will the air become that they must plead for additional relief:

> if we pray him, will his ear
> Be open, and his heart to pity incline,
> And teach us further by what means to shun
> The inclement seasons, rain, ice, hail and snow,
> Which now the sky with various face begins
> To show us in this mountain, while the winds

[1] A version of this chapter appears in "The Power of the Air in Milton's Epic Poetry," *SEL Studies in English Literature, 1500-1900* 56, no. 1 (February 2016): 149-70, © William Marsh Rice University. Milton, *Paradise Lost*, ed. Alastair Fowler, 2nd ed. (London: Longman, 1998), pp. 550-1; book 10, lines 211-3 and 216-7. Subsequent references to *Paradise Lost* are from this edition and will appear parenthetically in the text and notes as *PL* by book and line number.

Blow moist and keen.

(*PL*, 10.1060-6)

The word "inclement" echoes an earlier description of the tempestuous sky above "[t]he Paradise of Fools," where vain, heretical, and superstitious souls are exiled after life in this world (*PL*, 3.426 and 3.496). The skies over these earthly and superlunary "Paradise[s]" are inclement in the usual sense, producing the opposite of what we would call fine weather. But the term has moral implications as well. Where clemency implies the merciful or gentle use of power, "it droppeth as the gentle rain from heaven," inclement weather is relentless in producing human suffering.[2] The cruelty of the weather manifests in the description of Limbo's atmosphere where hooded clerics, hopeful of gaining heaven, become the "sport of winds," blown from its door "into the *devious air*" (*PL*, 3.493 and 3.489, emphasis added). With judgment mediated by the very air surrounding them, Adam and Eve's only hope for protection is divine clemency.

Another way to say the air is "devious" is to say that it errs. Milton is aware of the homophonic relationship between "air" and "error" and the union of these concepts in Satan's well-known title as "the prince of the power of the aire" from Ephesians.[3] Milton's epic illustrates how the air becomes wayward, or materially and spiritually biased towards evil and cruelty, by recounting how Satan rises to power as its prince. In

---

[2] William Shakespeare, *The Comical History of the Merchant of Venice, or Otherwise Called the Jew of Venice*, in The Norton Shakespeare, ed. Stephen Greenblatt (New York: W. W. Norton, 1997), pp. 1090-145, IV.i.180.

[3] Ephesians 2:2 (King James Version). For example, Death puns on pungent air when he says he won't "*err* / The way" to earth because he can smell the scent of carnage (*PL* 10.266-8, emphasis added).

the process of assuming his lordship over the air, Satan becomes implicit in it; his deviousness inhabits it. In portraying the air as charged with demonic essence, Milton expresses his vitalist animist notion of the universe as well as contemporary beliefs about the spiritual origins of the weather. The ominous figure employed by Adam to personify the air's mutability, its "various face," recalls the series of troubled expressions that contort Satan's countenance as he resolves to deceive man (*PL*, 4.114-7). Satan's facial contortions are writ large in postlapsarian weather, and, conversely, postlapsarian weather is prefigured in his face, expressing the bodily participation of demonic power in the air.

Karen L. Edwards, Joanna Picciotto, and John Rogers have detailed significant connections between Milton's poetry and seventeenth-century science; but Milton's fascination with the weather has been overlooked—and understandably so.[4] Meteorology is routinely excluded from "the historiographical tradition that describes the changes that natural philosophy underwent during the early modern period."[5] Yet meteorological forces permeate the material universe of *Paradise Lost* and are instrumental to its moral action. Scholarship has underestimated the pertinence of meteorology to the epic possibly

---

[4] Karen L. Edwards traces the influence of seventeenth-century natural history on Milton's epic (*Milton and the Natural World: Science and Poetry in "Paradise Lost"* [Cambridge: Cambridge Univ. Press, 1999]). For Joanna Picciotto, *Paradise Lost* is symptomatic of the experimentalists' efforts to recover an Adamic sense of vision (*Labors of Innocence in Early Modern England* [Cambridge MA: Harvard Univ. Press, 2010], pp. 400-507). John Rogers examines the relations between *Paradise Lost* and the revolutionary language of mid-seventeenth-century monistic vitalism in *The Matter of Revolution: Science, Poetry, and Politics in the Age of Milton* (Ithaca: Cornell Univ. Press, 1996), 103-76. One exception to this trend is Harinder Marjara whose well-informed discussion of meteorology in *Paradise Lost* demonstrates the interconnection of its natural systems (*Contemplation of Created Things: Science in "Paradise Lost"* [Toronto: Univ. of Toronto Press, 1992], pp. 163-86).

[5] Craig Martin, *Renaissance Meteorology: Pomponazzi to Descartes* (Baltimore: Johns Hopkins Univ. Press, 2011), p. 14. For reasons the history of meteorology has suffered neglect, see pp. 1-2 and 15-6.

because modern notions of the weather exclude phenomena that in Milton's era were deemed meteorological. The fallen angels' movements in Hell trigger mineralogical processes that, from our perspective, appear wholly unrelated to meteorological phenomena such as mist, dew, and rain and are even further removed from astronomical events such as comets and shooting stars. Yet the boundaries between these apparently distinct explanatory paradigms were at best blurry in the late Renaissance, as this sixteenth-century definition of meteorology demonstrates: "It is the part of physics that is concerned with what comes to be in the regions of the air or in the belly of the earth."[6] To us, the atmosphere is the sole source of the weather. But the term "atmosphere" was not coined until the mid-seventeenth century, and the region to which it refers forms just a part of the weather system as envisioned by early meteorology.[7] Rather, the far more diffuse concept of "air," a substance composed of hot and cold fumes thought to penetrate beneath the ground, underlay all meteorological activity in the world.

The modern notion of air as a neutral mixture of gases lies far off from what Milton would have understood about the air he breathed. According to the *OED*, the primary definition of the noun "air" in Milton's time was an "atmosphere contaminated by noxious fumes, vapours, etc." or "such contaminating fumes themselves."[8] Pestilence was not thought of as a pollutant, to use a modern term, but a defining feature of the air. Recognizing that the air was understood to be malignant by default allows us to trace

---

[6] Marcus Frytsche, *Meteorum, hoc est Impressionum Aerearum et Mirabilium Naturae Operum* (Wittenberg: Cratoniana, 1598), sig. A6v, qtd. and trans. in Martin, *Renaissance Meteorology*, p. 5.
[7] *OED*, 2d edn., s.v. "atmosphere, n.," 1. The word's first known appearance pertained to an extraterrestrial environment, the layer of air surrounding the moon in John Wilkins's *The Discovery of a World in the Moone* (1638).
[8] *OED*, 2d edn., s.v. "air, n.1," I.1.a.

seemingly unrelated events in *Paradise Lost* to a common demonic source. By endowing the demons with meteorological bodies as they gradually lose their angelic ones, Milton provides an account, consistent with scripture and contemporary attitudes about the air, of why the weather is the primal antagonist of man. This account of the weather, one of several origin stories told by the epic, reveals the immanence of demonic agency in Milton's representation of the natural world and the logic behind his account of Satan's "covert" temptation of man (*PL*, 2.41). Satan's scripturally defined role as "prince of the power of the aire" seems to license him to corrupt every stratum of the air, from the climate down to the breath of individual organisms. Access to the voice through the power of the air enables him to interfere secretly with Eve's mind while she sleeps and later to tempt her in the guise of the serpent. Thus, Milton mythologizes the ancient association between devils and the air in order to explain both the vicious character of weather in the fallen world and the lethal potential of sound.

Milton's dynamic representation of air is not circumscribed by a single theory or explanatory discipline, but rather reflects insights from both occult and empirically oriented traditions. To appreciate his explication of the spiritual sources of weather we thus draw on alternative and supplementary traditions regarding the air, including scriptural exegesis, demonology, and hagiography. Recovering the history of supernatural weather elucidates Milton's deliberate association of the demons in *Paradise Lost* with meteorological processes as well as with what I call the "pneumatics of temptation." The presentation of atmospheric phenomena in *Paradise Lost* sheds light on the history of the science of weather as we know it and illustrates the role the climate plays in theodicy.

I. "THE AIR / THE REALM ITSELF OF SATAN"

Let us begin with Milton's representation of Satan as ruler of the air. Throughout his poetry, Milton affirms the doctrine that in the fallen world, Satan and his demonic crew are allowed to possess the air—particularly its middle region. This is the middle layer (*media regio*) of the sublunary atmosphere, which Milton and his contemporaries divide into three parts: a hot upper region (*suprema*), a habitable lower region (*infirma*), and a meteorologically eventful middle. The relatively cold middle part reaches as high as the tallest mountains and receives vapors from below that gather there, form clouds, and turn to rain.[9] The idea that the fallen angels might settle this region of air emerges during the demonic debates in book 2 of *Paradise Lost* and gradually comes to fruition as Satan infiltrates earth's atmosphere.[10]

At the beginning of the poem, Beëlzebub beguiles the infernal council with conjectures about the new world, where, he speculates, they may "in some mild zone / Dwell," and whose "soft delicious air, / To heal the scar of these corrosive fires / Shall breathe her balm" (*PL*, 2.397-8 and 2.400-2). Experiencing the earth's atmosphere for the

---

9 Francis Bacon was an exponent of this theory. He writes of the process of condensation, "We see it also in the effects of the cold of the middle region (as they call it) of the air; which produceth dews and rains" (*Sylva Sylvarum: Or a Natural History*, in *The Works of Francis Bacon, Baron of Verulam, Viscount St. Albans, and Lord Chancellor of England*, ed. James Spedding, Robert Leslie Ellis, and Douglas Denon Heath, 15 vols. [Boston: Houghton Mifflin, 1900], 4:151-477, 172-3). For Milton's explication of the tripartite system, see A. W. Verity's note on Milton's concept of "middle air" ("Appendix D: Paradise Lost, I.515-17," in *Paradise Lost*, ed. Verity [Cambridge: Cambridge Univ. Press, 1910], pp. 674-6, 674).

10 The narrator first identifies the "middle air" as the province of the Greek Olympian gods in the catalogue of demons (*PL*, 1.516).

first time like a sailor "[w]ell pleased" with its exotic fragrance crystallizes Satan's plan to resettle Hell's inmates there (*PL*, 4.164). He tells the angelic guard that he aims either "here on earth, or in mid-air" to install his "afflicted powers" (*PL*, 4.939-40). After the Fall, Satan proclaims that his offspring Sin and Death should "on the earth / Dominion exercise and in the air" (10.399-400). Then, in *Paradise Regained*, we learn that Hell's other citizens have since migrated to earth and now inhabit "the middle region of thick air."[11]

One might dismiss Milton's association of the devils with the air as merely an allegory or a parody of religious superstition. Their promised habitation shares the attributes of impermanence and airiness with Milton's Ariostian Limbo, where he locates the souls of "[e]mbryos and idiots, eremites and friars" and "all things transitory and vain," which "like aërial vapors flew" (*PL*, 3.445-6 and 3.474). Descriptions of the realm of air occasionally display the implausible concreteness and incongruous detail that Mindele Anne Treip associates with Miltonic allegory.[12] Satan's "place" in *Paradise Regained*, for instance, is characterized anachronistically as a "gloomy consistory" among "thick clouds and dark tenfold involved" (1.39 and 1.41-2). Yet Milton's airy devils are not mere epic machinery, as are the sylphs of Alexander Pope's *The Rape of the Lock* (1712). Milton may mock the presumed loftiness that the demons derive from

---

[11] Milton, *Paradise Regained*, in *John Milton: The Complete Shorter Poems*, ed. John Carey, 2d edn. (London: Longman, 1995), pp. 424-512, 448; book 2, line 117. Subsequent references to *Paradise Regained* are from this edition and will appear parenthetically in the text as *PR* by book and line number.

[12] Mindele Anne Treip argues that certain characterizations of the Devil mix elements of realism with unrealism. One sign of this mixed allegorical mode is the too literal description of unreal or supernatural beings; another is the device of implication, or characterization by allusion to incongruous spaces and/or temporalities (*Allegorical Poetics and the Epic: The Renaissance Tradition to "Paradise Lost"* [Lexington: Univ. Press of Kentucky, 1993], pp. 239-47).

their airy station, but nowhere does he question the scriptural basis of their association with air. That demons occupy the air under Satan's headship is presented as a fundamental condition of the postlapsarian world. We see this in book 10 of *Paradise Lost*, when the narrator describes the life and resurrection of Christ as the fulfillment of the serpent's curse:

> So spake this oracle, then verified
> When Jesus son of Mary second Eve
> Saw Satan fall like lightning down from heaven,
> *Prince of the air*; then rising from his grave
> Spoiled principalities and powers, triúmphed
> In open show, and with ascension bright
> Captivity led captive through *the air,*
> *The realm itself of Satan long usurped*,
> Whom he shall tread at last under our feet;
> Even he who now foretold his fatal bruise.
>
> (10.182-91, emphasis added)

The words "long usurped" imply the stability and historical truth of the doctrine of Satan's power over the air, as does Satan's characterization of the air in *Paradise Regained* as "[t]his our *old conquest*" (1.46, emphasis added). The passage alludes to multiple scriptural verses relating to Satan's airy kingdom: "the prince of the power of the aire, the spirit that now worketh in the children of disobedience"; "I beheld Satan as lightning fall from heaven"; "having spoyled principalities and powers, he made a shew

of them openly, triumphing over them in it"; "When he ascended up on high, he led captivitie captive."[13] Milton's allusion to these verses at this grave moment in the poem—God's judgment of Satan in the serpent—demonstrates that Milton, whose theology is scrupulously and minutely calibrated to scripture, insists on the authenticity of the doctrine of Satan as "prince of the power of the aire." Allusions to many of the same biblical passages in Michael's description of the Ascension ("[Christ] shall ascend / With victory, triúmphing through the air" and "there shall surprise / The serpent, prince of the air") confirm that Milton considered this doctrine a crucial part of revelation, basic to understanding Christ's mission on earth and the nature of the evil he overcomes (*PL*, 12.451-4). In *Christian Doctrine*, Milton cites Ephesians 2:2 in conjunction with other passages to show that bad angels wander "the earth, the air, and even heaven" and that God suffers these wanderings in order to carry out his judgments.[14] By placing demonic activity in the world under divine government Milton affirms the reality of Ephesians 2:2. God not only permits Satan's occupation of the air, but he also expresses his will through it as an instrument of divine providence.

The sometimes shockingly heretical Milton is hardly heterodox in the literalism of this belief, however odd it may seem to us now. He echoes a truism of the premodern world: demons inhabit the air and exercise control over meteorological phenomena such as the weather. The writings of the Church Fathers shed light on the origins of this belief.

---

[13] Ephesians 2:2, Luke 10:18, Colossians 2:15, and Ephesians 4:8 (KJV).

[14] Milton, *Christian Doctrine*, in ca. 1658-ca.1660, ed. Maurice Kelley, vol. 6 of *The Complete Prose Works of John Milton*, ed. Don M. Wolfe, 8 vols. (New Haven: Yale Univ. Press, 1973), pp. 125-807, 337, 348-9, and 395. Milton mainly cites Ephesians 2:2 when he discusses Satan's God-given power over the spiritually dead or blind.

In a gloss on Ephesians 6:12, for instance, St. Jerome invokes "the view of all teachers that that air which divides between heaven and earth and is called empty space is full of contrary powers."[15] Jerome's sense of the ubiquity of the doctrine likely refers to its acceptance outside of, as well as within, Christianity. Clinton E. Arnold argues that the intent of the Epistle to the Ephesians and its verses pertaining to the "prince of the power of the aire" is to offer relief in the form of Christ's salvific power to a community whose magical religious practices reflected their belief in the real agency of spiritual beings.[16] Ephesians consolidates these pagan "powers" under one enslaving prince and explains that he along with his host of demons have been subordinated to the power of Christ.[17] The figure Christ overcomes is possibly depicted as a ruler of the domain of air because "the air was regarded as the dwelling place of evil spirits in antiquity."[18]

In *The City of God against the Pagans*, Augustine alludes to a non-Christian tradition that conceived of the air as full of supernatural beings, and he relates it to Christianity.[19] In book 10, chapter 21, headed "The measure of power granted the demons for the glorification of the saints through their strength to endure suffering; for the saints triumphed over the spirits of the air, not by doing their pleasure, but by abiding in God," Augustine compares the martyrs of the Church with the Greek heroes, the fabled "souls

---

[15] St. Jerome, "Ephesians 6:12," in *The Commentaries of Origen and Jerome on St Paul's Epistle to the Ephesians*, ed. Ronald E. Heine (Oxford: Oxford Univ. Press, 2002), pp. 254-60, 258.
[16] Clinton E. Arnold, *Ephesians: Power and Magic: The Concept of Power in Ephesians in Light of its Historical Setting* (Cambridge: Cambridge Univ. Press, 1989).
[17] Arnold, pp. 167-70
[18] Arnold, p. 60.
[19] Augustine, Books VIII-XI, trans. David S. Wiesen, vol. 3 of *The City of God against the Pagans*, ed. George E. McCracken, 7 vols. (London: William Heinemann, 1968).

of the departed as earned distinction to some degree in this life."[20] Augustine says their name derives from Hera—the ruler of the air according to Greek myth—and they dwell in the atmosphere with the demons.[21] The martyrs of the "true" religion, however, deserve the name of hero for another reason: "not because they and the demons could be members of one community in the air, but because they overcame these same demons, that is to say, powers of the air, and in company with them Juno herself….Our heroes, if usage permitted us so to call them, do not in the least resort to gifts to overbear Hera, but to valour that comes from God."[22] Augustine does not contest the existence of deities and demons of the air, but he stresses that the Christian orientation toward them is hostile, not conciliatory. Milton's portrayal of the middle air in *Paradise Lost* aligns with this account, where the air functions as an ecumenical space for demons. Just as Augustine acknowledges that demons of the air are real to both pagans and Christians, Milton's middle air offers asylum to all adversaries of the Judeo-Christian God regardless of their genealogy (*PL*, 1.515-7).[23]

---

[20] Augustine, Books VIII-XI, pp. 343-7, 345.

[21] Augustine explains further, "This name is said to have been derived from Juno, because in Greek Juno is called Hera, and therefore one or another of her sons, according to Greek mythology, was called Heros. Now the cryptic meaning of the myth is this. The air (*aer*) is counted as Juno's realm, and there, they would have it, the heroes dwell together with the demons" (ibid.). According to one ancient tradition, Hera is associated with the element of air because in Greek her name is an anagram of "aer" (Peter Kingsley, *Ancient Philosophy, Mystery, and Magic: Empedocles and Pythagorean Tradition* [Oxford: Clarendon Press, 1995], p. 15).

[22] Augustine, Books VIII-XI, pp. 345-7. For philosophical background on heroes and demons, see Keimpe Algra, "Stoics on Souls and Demons: Reconstructing Stoic Demonology," in *Demons and the Devil in Ancient and Medieval Christianity*, ed. Nienke Vos and Willemien Otten (Leiden: Brill, 2011), pp. 71-96, especially 76 and 82-4.

[23] Milton makes no distinction between the demons and the deities of the pagan world: "By falsities and lies the greatest part / Of mankind they corrupted to forsake / God their Creator," and "And devils to adore for deities" (*PL*, 1.367-9 and 1.373).

Medieval and scholastic writers applied the doctrine of a demonic realm of air, lorded over by Satan, to the field of meteorology, alleging that these diabolical powers could influence the weather and use it to torment or punish men.[24] They were not first to attribute meteorological phenomena to supernatural or divine agency. While the Greek natural philosophers, beginning with Thales of Miletus (ca. 620—ca. 546 BCE), eschewed supernatural explanations in their rational accounts of meteors, the ancient poets famously assigned the motions of the atmosphere to individual gods, such as Zeus, god of thunder and lightning and Aeolus, lord of the winds. In the Christian era, medieval and Renaissance authorities frequently relied on scripture to explain atmospheric marvels; they often viewed rare occurrences such as comets as portending future events and attributed weather patterns to the operation of providence.[25] It was especially common for professors at the Lutheran universities to interpret such meteorological activity as a sign of God's will. Martin Luther himself was convinced of their predictive or providential significance, and Philip Melancthon, who created much of the schools' curriculum on natural philosophy, insisted on the moral and historical meaning of disastrous weather.[26] Thus, throughout antiquity and into the Renaissance there existed a thoroughly teleological tradition of meteorological explanation, and within this tradition, churchmen, occultists, and natural theologians speculated that catastrophic or rare

---

[24] As Andrew D. White demonstrates, St. Bede, St. Albertus Magnus, St. Thomas Aquinas, and St. Bonaventura all affirmed that weather phenomena could be affected by demons (*A History of the Warfare of Science with Theology in Christendom*, 2 vols. [New York: D. Appleton, 1915], 1:336-8).
[25] White gives a history of scripture-based meteorological explanation from Tertullian to the Schoolmen (1:323-31).
[26] Martin, *Renaissance Meteorology*, pp. 51-9.

weather events—storms, thunderbolts, lightning—were the work of evil spirits.[27] Thomas Aquinas's avowal that, "with God's permission, demons can induce turbulence of the air, stir up winds, and make fire fall from heaven," reflects the solemn orthodoxy of the idea; but it was also taken up by unorthodox authors such as Jean Bodin, whose *Universae Naturae Theatrum* (1596) was deemed heretical enough by the Catholic Church to warrant censorship throughout the Counter Reformation.[28] A curious amalgam of religion and science with a metaphysics similar to Milton's (replete with corporeal angels, demons, and souls), the *Theatrum* attributes violent winds and storms to demons "acting under divine command."[29]

The notion that demons rule the air appears in hagiographical traditions as well. The legend of St. Anthony, as told by Athanasius in the fourth century, inspired a number of Renaissance artworks that depict the sky as the territory of devils. Several focus on St. Anthony's vision of himself being carried into the air and taken to task by "foul and terrible figures standing in the air."[30] Athanasius writes, "[Antony] was amazed to see how many foes our wrestling involves, and how many labors someone has in passing through the air, and he recalled that this is what the Apostle said, *following the prince of*

---

[27] White, 1:323-36.

[28] The corresponding passage in Latin: "deo permittente daemones possunt turbationem aeris inducere, ventos concitare, et facere ut ignis de caelo cadat" (Thomas Aquinas, "Expositio super Job ad litteram" in *S. Thomae Aquinatis Opera Omnia*, ed. Roberto Busa, 7 vols. [Stuttgart-Bad Cannstatt: Frommann-Holzboog, 1980], 5:3). For the English translation quoted above, see Aquinas, *The Literal Exposition of Job: A Scriptural Commentary Concerning Providence*, trans. Anthony Damico, vol. 38 of *The Collected Works of St. Thomas Aquinas. Electronic Edition*, 47 vols. (Charlottesville, VA: InteLex Corp., 1993), pp. 71-90, 86; and Ann Blair, *The Theater of Nature: Jean Bodin and Renaissance Science* (Princeton: Princeton Univ. Press, 1997), pp. 180-224, 184.

[29] Blair, p. 145. Here, Blair paraphrases Bodin's discussion of the violent weather's demonic source (Bodin, *Universae Naturae Theatrum* [Lyon: Jacques Roussin, 1596], p. 160).

[30] Athanasius, "The Life and Affairs of Our Holy Father Antony," in *Athanasius: The Life of Antony and The Letter to Marcellinus*, ed. and trans. Robert C. Gregg (New York: Paulist Press, 1980), p. 79.

the power of the air."[31] In his first known painting, *The Torment of Saint Anthony* (ca. 1487-8), a young Michelangelo depicts the saint as being attacked in midair by winged, scaled, and club-wielding demons.[32] A tableau of St. Anthony's temptation by Netherlandish painter Hieronymous Bosch (ca. 1450-1516) of Anthony's temptation and an etching of the same subject by Jacques Callot (1592-1635), a printmaker from the Duchy of Lorraine, both present skies that swarm with evil spirits in various shapes and horrifying postures.[33] In one panel of Bosch's majestic *Triptych*, Anthony is lifted into the air and tormented by demons in flying ships. The painting *Sea Storm* (ca. 1508-28), by Palma Vecchio (1480-1528), also features demonic sailors.[34] In Vecchio's piece, which represents the fourteenth-century legend wherein St. Mark, St. George, and St. Nicholas rescue Venice from a great storm, the saints steer a small craft toward an ominous black ship that has been commandeered by devils.[35] Shadowy silhouettes on the riggings of this bark blend into the stormy atmosphere around the boat, giving the impression that the demons are embodiments of bad weather.

Early modern viewers would have easily decoded these motifs, all of which present the devils in their traditional and scripturally warranted role, harnessing the power of air to execute punishments on man. Their frequent association with airborne

---

[31] Ibid.

[32] Michelangelo, *The Torment of Saint Anthony*, ca. 1487-8, oil and tempura on panel; housed at the Kimbell Art Museum in Ft. Worth, Texas.

[33] Bosch, *Triptych of the Temptations of St. Anthony*, 1501, oil painting on wood panels; housed at the Museu Nacional de Arte Antiga in Lisbon, Portugal; and Callot, *The Temptation of Saint Anthony*, 1635, etching; housed at the Spencer Museum of Art at the University of Kansas in Lawrence, Kansas.

[34] Palma Vecchio, *Sea Storm*, c. 1508-28, oil on canvas; housed at the Galleria dell' Accademia, in Venice, Italy. On the difficulty of precisely dating the painting, see Philip L. Sohm, "Palma Vecchio's *Sea Storm*: A Political Allegory," *RACAR* 6, 2 (1979-80): 85-96, 89.

[35] Sohm, p. 85.

ships lies behind the many nautical analogies applied to Satan in *Paradise Lost*, such as the comparison of him to a fleet of mercantile vessels that "[h]angs in the clouds, by equinoctial winds" (2.637). Nautical imagery lends itself to demonological representation perhaps because the figure of a ship evokes mobility, agility, and worldliness—traits that enable aerial spirits to harass and misguide mortals. Milton's suspension of the boats in midair—the fleet "[h]angs in the clouds" much like the airborne vessels of Bosch's *Triptych*—signals Satan's supernaturalism and underscores his affiliation with the atmosphere. Completely dependent on wind for movement, a sailboat is both an instrument of weather and its captive, expressing and channeling the wind's motion while continually in danger of being overpowered by it. As a metaphorical vehicle for Satan, the sailboat thus reflects his paradoxical status as a power of air: he is permitted to direct and exploit the power of the atmosphere, but is ultimately reliant on God for propulsion and, indeed, for ontological continuance.

Meteorological agency is not reserved exclusively for demonic beings. Luther is purported to have said, "Winds are nothing but spirits, either good or evil. The devil sits there and snorts, and so do the angels when the winds are salubrious."[36] Aquinas likewise holds that both good and bad angels (*spiritus boni sed etiam mali*) can impel local atmospheric changes, but only insofar as God will allow.[37] Milton's God is similarly indifferent to the moral status of his meteorological agents. According to Raphael, either

---

36 Martin Luther, *Table Talk*, ed. and trans. Theodore G. Tappert, vol. 54 of *Luther's Works*, ed. Helmut T. Lehmann, 55 vols. (Philadelphia: Fortress Press, 1967), p. 82.

37 "Quamvis enim materia corporalis non oboediat ad nutum angelis neque bonis neque malis ad susceptionem formarum sed soli creatori deo, tamen ad motum localem natura corporea nata est spirituali naturae oboedire" (Aquinas, "Expositio super Job ad litteram," p. 3). Aquinas, *The Literal Exposition of Job*, p. 77.

band of angels, good or apostate, can "wield / These elements, and arm him with the force / Of all their regions" (*PL*, 6.221-3). The climate changes accomplished by good and evil meteorological agents after the Fall, however, reveal a key point of distinction between them. Sin and Death, for instance, cause damage to the stars and planets simply by going near them:

> Their course through thickest constellations held
> Spreading their bane; the blasted stars looked wan,
> And planets, planet-strook, real eclipse
> Then suffered.
>
> (*PL*, 10.411-4)

The simultaneously active and passive word "Spreading" suggests that they impart their fatal nature automatically, if not compulsively, to whomever and whatever crosses their path. The good angels interfere with the same apparatuses of weather in an entirely different way. They are depicted as "prescrib[ing]" the planets' movements and teaching the fixed stars when to cross man (*PL*, 10.657). Unlike the ambiguous term "Spreading" applied to Sin and Death, these verbs present the angels' approach to the weather as deliberate, detached, and controlled. This difference in diction reflects the agents' volitional position with respect to God. The angels willingly fulfill His commands, whereas the "Dogs of Hell" seem to do so instinctively, unwittingly executing God's plan by subjecting the world to their pernicious influence.

The ambiguous language used to characterize Sin and Death's contact with the heavens possibly reflects their status as allegorical beings; it also fits with a general

pattern by which the poem elaborates their association with air. Unlike the good angels, who keep their individuality distinct from nature by transforming it didactically via "precept," the demons physically assimilate themselves to the climate and vice versa (10.652). Their immersive agency is evident from the fact that "bane" flows from them like a fluid substance into the heavens; it is also evident from the reflexive syntax of "planets, planet-strook," which captures how the monsters reflect and embody the planets' malignant function. Throughout the poem, Milton not only employs figures of mixture to insinuate the devils' environmental incorporation, but he also implies their likeness to meteorological forces analogically. We see both techniques in the alternative views of Satan bubbling up through a fountain in Paradise, literally "involved in rising mist," versus his stalking the serpent figuratively, "*[l]ike* a black mist low creeping" (*PL*, 9.75 and 9.180, emphasis added). The duality of these representational modes creates a flickering effect, projecting an image of the devils as both embodiments and reflections of the weather.

Raphael's narration of the battle in heaven refers often to Nature's elements (wind, thunder, clouds, rain, hail, dew, and mist) to describe the angels' feats of war. As it applies to the good angels, Raphael's naturalistic imagery simply reflects and underscores the sublimity of their deeds. The tempest said to accompany the stroke of Abdiel's sword and the simile that compares the impact of the blow to a subterranean wind dislodging a mountain, for instance, impute cataclysmic force to Abdiel (*PL*, 6.190-7). Raphael invokes the power of wind to characterize Michael's fierce combat with Satan, and the supreme powers of thunder and lightning are reserved for the omnipotent

Father and Son (*PL*, 5.893, 6.308-10, 6.836, and 6.849). When Raphael applies meteorological figures to the apostate angels, however, there is a corresponding change in tenor. Rather than aggrandizing Satan's faction, the imagery presents the apostate angels as physically darkened or burdened by pain, foreshadowing their deteriorated condition as vanquished spirits of Hell. Cloud imagery plays a key role in portending this fall.

II. Clouded Minds and Bodies

Neither dangerous nor remarkable in themselves, clouds are harbingers of inclement weather. Insofar as they characterize intellectual beings in Milton's works, they also perform a semiotic function by manifesting a person's psyche in the cloudiness of his or her face. The characterization of divine persons with cloud imagery poses a special case. The presence or absence of clouds surrounding God is not so much a reflection of his inward state as the divinity of those who view him. Thus, God appears to the angels, who are too weak to look at him directly, "through a cloud," but addresses the Son "without cloud, serene" (*PL*, 3.378 and 11.45). And like a magical glass, the Son's serene face reveals God to man in a form he is capable of seeing; in his "conspicuous countenance, *without cloud* / Made visible, the almighty Father shines" (*PL*, 3.385-6, emphasis added). With creatures, however, clouds do not have a shielding or veiling function, but signify, rather, the presence of sin, injury, or inner turmoil. When he wakes Eve from her bad dream, for instance, Adam banishes clouds of distress from her visage: "Be not disheartened then, nor *cloud* those looks / That wont to be more cheerful and serene" (*PL*, 5.122-3, emphasis added). Because he believes—perhaps naively—that Eve

has not been corrupted by the dream, Adam thinks her face should be free of clouds. In *The Second Defense of the English People* (1654), Milton uses the phrase "without a cloud" to describe the deceptively uninjured appearance of his blind eyes.[38] Here, the absence of clouds, signifying healthy organs of sight, gives a false reading of the inner condition. As with real weather prediction, Milton seems to point out, looks can be deceiving.

The clouds that gather around the embattled rebels in Heaven, however, do not misrepresent their mental and physical disquietude. When one of the rebels' leaders, Nisroch, responds to Satan's call for martial innovation, Raphael tells us that he is badly wounded and "cloudy in aspéct" (*PL*, 6.450). Likewise, on the morning of the second day of battle, Zophiel informs the obedient angels of the hazy shape of the approaching foe: "so thick a cloud / He comes, and settled in his face I see / Sad resolution and secure" (*PL*, 6.539-41). Due to the delaying effect of enjambment in these lines, we momentarily imagine that Zophiel has seen a thick cloud settled in the enemy's face and recall the moment in book 4 when Uriel informs Gabriel of the telltale passions he discerned in Satan's countenance (*PL*, 4.570-1). In both cases, facial disfiguration suggests the inner state of misery that accompanies sin.

The fallen angels' suffering is physiological as well as mental. The shocking revelation of book 6 that the rebel angels can feel pain manifests the bodily consequences of sin. Satan insists that his self-healing wound is proof of their "Imperishable" form and

---

[38] Milton, *The Second Defense of the English People*, in *The Complete Poetry and Essential Prose*, ed. William Kerrigan, John Rumrich, and Stephen M. Fallon (New York: Modern Library, 2007), pp. 1069-1110, 1079.

"native vigor" (*PL*, 6.435-6), and Raphael confirms Satan's immortality, comparing the resilience of angelic substance to the fluid texture of air (*PL*, 6.348-9). But neither account of their injuries addresses the material cause of this susceptibility. It takes the dissolution of their forms—or nearly that when the mountains of heaven come crashing down on them—to discover the corporeal basis of their pain:

> Their armour helped their harm, crushed in and bruised
> Into their substance pent, which wrought them pain
> Implacable, and many a dolorous groan,
> Long struggling underneath, ere they could wind
> Out of such prison, though spirits of purest light,
> Purest at first, now gross by sinning grown.
>
> (*PL*, 6.656-61)

Their inability to wiggle out of the crushed suits of armor quickly suggests that the viscosity of their spiritual beings has changed. But what has it changed into? The meteorological pun on the verb "wind" invites us to conceive of their now-gross substance in terms of the weather. The rebel angels' "dolorous groan[s]" recall the wailing of a gale, and the coagulation of their pure essence reminds us of Zophiel's association of the marching rebels with a "thick" cloud.

One reason Milton might have used figures of weather, such as clouds and wind, to portray the literal and metaphorical hardening of the disobedient angels is that, from the perspective of scholastic physics, meteorological phenomena represent an imperfect state of matter. The natural law that Milton's God gives to the elements in their ideal

state—to "know / No gross, no unharmonious mixture foul"—implies that their non-ideal condition in the fallen world is mixture and disharmony (*PL*, 11.50-1). In this view, he echoes medieval and Renaissance commentators who typically allude to Aristotelian meteorology as the study of "imperfect mixtures."[39] Not all mixtures were thought to be defective, but "[m]eteorological phenomena were considered imperfect because they were composites of the elements that had not been transformed into a new substance."[40]

Matter theory clarifies why the demons' embodiment of the weather accompanies the loss of their refined angelic bodies. The very term for meteorological formation, "imperfect mixture," connotes physical depravity as it directly negates the initial good condition of all God's creatures, who are given "perfect forms," are "[p]erfect within," and who "God made…perfect, not immutable" (*PL*, 7.455, 8.642, and 5.524). Meteorological mixture, moreover, represents a state of unrest, which is precisely the condition Satan embodies. The elements' endless transformations into one another, outlined in Aristotle's theory of generation and corruption, reflect the tortuous revolution of passions throughout Satan's body.[41] The inner turmoil he experiences before descending into Eden, "[n]ow rolling" and "boil[ing] in his tumultuous breast" reveals the essentially meteorological dynamic of his being:

each passion dimmed his face

Thrice changed with pale, ire, envy and despair,

---

[39] Martin, *Renaissance Meteorology*, p. 42.

[40] Martin, *Renaissance Meteorology*, pp. 42-3.

[41] See Aristotle's *De Generatione et Corruptione*, trans. C. J. F. Williams (Oxford: Clarendon Press, 1982), pp. 41-3. Aristotle reiterates this point in his *Meteorologica*, stating that all of the elements are transformable into each other (*Meteorologica*, trans. H. D. P. Lee [Cambridge MA: Harvard Univ. Press, 1952], pp. 11 and 23).

Which marred his borrowed visage, and betrayed

Him counterfeit, if any eye beheld.

For heavenly minds from such distempers foul

Are ever clear. Whereof he soon aware,

Each perturbation smoothed with outward calm.

(*PL*, 4.16 and 4.114-20)

Satan's face is presented as a sky, his mind a turbulent microclimate, and his passions (significantly the narrator enumerates four of them) the intermixing elements. Because his body is subject to such commotions, Satan's face, whether it openly expresses distress or is artificially smoothed over, is a medium of meteorological signification.

It is easy to see why cloudiness, a partial mixture of the elements of air and water, serves as a poetical figure for the fallen spirits' states of impurity. Yet Milton had reason to believe that the demons had actually transformed into the stuff of clouds. By assigning them the qualities of clouds or mist, Milton conforms to the way theologians discuss the bodies of fallen angels. Augustine locates the rebellious angels in the earthly atmosphere and grants them bodies of air.[42] If they had bodies "of a celestial nature" before their fall, he reasons, then when they sinned they "were changed into the element of air so that they might undergo suffering from the element of fire."[43] The implied logic is that punitive fires may hurt bodies composed of an element such as air, though not bodies of a purer

[42] This was his initial position, although later in life Augustine decided that the demons dwell in a subterranean hell (Allan D. Fitzgerald, ed., *Augustine through the Ages: An Encyclopedia* [Grand Rapids MI: William B. Eerdmans Publishing, 1999], p. 247).

[43] Augustine, "Books 1-6," vol. 1 of *St. Augustine: The Literal Meaning of Genesis,* ed. and trans. John Hammond Taylor, 2 vols. (New York: Newman Press, 1982), p. 84.

celestial substance, such as those of the faithful angels. Associated with the alteration of the disobedient angels' substance is their ejection from the highest region of atmosphere, which contains pure air "joined in common bond of peace with the heavens," and relegation to the misty atmosphere below, which is "full of water in a refined and vaporous state."[44] In interpreting Augustine, Peter Lombard, author of the influential twelfth-century work *Sentences*, reinforces the implied connection between the angels' elemental change and their atmospheric relocation, concluding that their substance thickened according to the nature of the air in their new habitation: Augustine "seems to say that all angels before their confirmation or fall had aerial bodies, formed from the purer and higher part of the air and suitable for acting, but not for suffering. And such bodies were preserved for the good angels who remained steadfast…But the bodies of the evil angels in their fall were changed into an inferior quality of thicker air. For just as they were cast down from a worthier place to a lower one, that is, into this cloudy atmosphere, so their refined bodies were transformed into inferior and thicker ones."[45] Here we find a theological precedent for connecting the fallen angels' substance with the misty realm of atmosphere they eventually populate, or, the middle air.

Milton does not identify the fallen angels with a single element, but Augustine and Lombard's precedent suggests why he portrays the corrupt angels as resembling and behaving like clouds and condensing or acquiring thickness. These depictions reify the angels' moral and physical degradation and anticipate their future confinement to a sub-

---

[44] Augustine, *St. Augustine: The Literal Meaning of Genesis*, p. 83.
[45] Peter Lombard, *On Creation*, book 2 of *The* "*Sentences*," 4 books, trans. Giulio Silano (Toronto: Pontifical Institute of Mediaeval Studies, 2008), p. 34.

empyreal region where "there is air, but it is air saturated with the vapor that produces winds when stirred, lightning and thunder when violently agitated, clouds when gathered in a mass, rain when condensed, snow when clouds are chilled."[46]

III. The Meteorology of Satanic Expression

The purpose of Milton's association of the devils with meteorological phenomena is twofold. As I have argued, it illustrates the origination of their role as weather makers in the fallen world. Additionally, it supplies an explanation for the nature of Satan's overtures to Eve, which take the form of delusive sounds culled from the atmosphere. The dream Satan conjures pneumatically through Eve's ear, as with an organ or "inspiring" breath and the words he addresses to her through the serpent, depend equally on his flexible aerial nature and ability to simulate sounds (*PL*, 4.804). Milton endows the demons with a physical affinity to atmosphere in part to render their scripturally designated role as powers of air and weather but also to enable Satan's atmospheric interference with voices in Paradise. *Paradise Regained* portrays Satan's ability to channel his essence into aural form as the principal way he misleads men. His "chosen task," according to Jesus, is "[t]o be a liar in four hundred mouths"; he is "composed of lies," which are his "sustenance" and "food" (*PR*, 1.407 and 1.427-9). Recalling Satan's vocalization of the serpent, these characterizations affirm the continuance of Satan's vocal power after the Fall and attribute it to his bodily composition (he is "composed of lies"). We find the archetype of this method of deception, by which Satan channels

[46] Augustine, *St. Augustine: The Literal Meaning of Genesis*, p. 84.

himself into the mouths of others, in *Paradise Lost*, where Satan transfers his airy substance into the serpent and uses it to deceive Eve.

But why does Satan's meteorological power translate into the ability to counterfeit the speech of others? A partial answer may be found in the language of meteorological theory. In their frequent invocation of respiratory models, early meteorological treatises imply a fundamental relationship between weather and vocality. This convention derives from Aristotle's theory of exhalations, which attributes diverse phenomena such as comets, metals, and earthquakes to the action of certain vapors above and beneath the Earth's surface.[47] Aristotle distinguishes between two kinds of exhalation; one is moist and cold, which he calls ἀτμίς, and the other hot and dry, called ἀναθυμίασις.[48] Renaissance meteorologists employed additional respiratory terms such as *halitus* (breath, exhalation, steam vapor) and *spiratio* (a breathing) to characterize these exhalations.[49] Since virtually all seventeenth-century writers, including René Descartes, incorporated exhalations into their meteorological theories, the associated oral terminology is a hallmark of such texts.[50]

For Aristotle, the air itself is comprised of exhalation. He defines it as a dynamic compound "made up of these two components, vapor which is moist and cold…and

---

[47] Consider the central role exhalations play in this explanation of earthquakes, for example: "[T]here must be exhalation both from moist and dry, and earthquakes are a necessary result of the existence of these exhalations. For the earth is in itself dry but contains much moisture because of the rain that falls on it; with the result that when it is heated by the sun and its own internal fire, a considerable amount of wind is generated both outside it and inside," (Aristotle, *Meteorologica*, p. 205). For a summary of Aristotelian exhalation theory, see Liba Taub, *Ancient Meteorology* (London: Routledge, 2003), pp. 88-91 and 114.
[48] H. D. P. Lee, trans., "Note on the Strata in Aristotle's Universe," in Aristotle, *Meteorologica*, pp. 26-7.
[49] See Chapter 1, note 28.
[50] Martin, "Causation in Descartes' *Les Météores* and Late Renaissance Aristotelian Meteorology," in *The Mechanization of Natural Philosophy*, ed. Daniel Garber and Sophie Roux (New York: Springer, 2013), pp. 217-36, 227.

smoke which it hot and dry."[51] Various physical factors, such as the movement of the stars, activate these gases and trigger meteorological events: dry exhalation ignites to produce shooting stars or lightning; moist exhalation condenses into cloud, mist, dew, or rain.[52] Illustrating Milton's vitalistic conception of matter, exhalation in *Paradise Lost* tends to confer orality on all its meteorological processes. Adam and Eve describe the Earth's rising "mists and exhalations" as voicing God's praise as they infuse the atmosphere with clouds and rain, and at the hour of their nuptials the earth vocalizes her felicity with "fresh gales and gentle airs," an allusion to the popular musical form known as the air (*PL*, 5.185 and 8.515). But the same perfumed breezes, which Milton fits with "odoriferous wings" as if to liken them to winged spirits, "entertained" the fiend with their pleasant scents on his arrival to Paradise and "whisper whence they stole / Those balmy spoils" (*PL*, 4.157-9 and 4.166). Their whispers are agreeable and even serviceable to Satan because exhalations, as ingredients of air, are his inheritance. Therefore, in addition to cycling elemental praise through a breathing creation, exhalation exposes meteorological phenomena to demonic appropriation. Wherever there is exhalation, there is opportunity for satanic corruption.

Since human utterance is made from bodily exhalation, Milton portrays dew and condensation, products of meteorological exhalation, as mechanisms of environmental utterance. Because they possess "clouded" or vaporous bodies, the fallen angels are necessarily implicit in natural processes of liquefaction, which transmit their spiritual

---

[51] Aristotle, *Meteorologica*, p. 167.

[52] Aristotle, *Meteorologica*, pp. 29-35, 69-75, and 223-31. For a summary of the processes by which meteorological phenomena such as shooting stars, thunder, and lightning are formed from dry exhalation, see Taub, p. 90.

being into a more corporeal form. The simile in book 5 that compares the defected angels to droplets of morning dew thus represents the rebel angels' swift relocation to the north as a result of condensation:

Satan with his powers

Far was advanced on wingèd speed, an host
Innumerable as the stars of night,
Or stars of morning, dewdrops, which the sun
Impearls on every leaf and every flower.

(*PL*, 5.743-7)

Here, the shifts from night to day, aerial to solid, high to low, foreshadow the "foul descent" Satan undergoes when he slinks back into the garden "wrapped in mist / Of midnight vapor" (*PL*, 9.158-9 and 9.163). Just as aerial angels "[i]mpearl" themselves into dewdrops, Satan condenses by "incarnat[ing] and imbrut[ing]" himself into "bestial slime" (*PL*, 9.165-6).

Satan undertakes this moral and material descent from mist to slime to inhabit the snake and make it speak or seem to speak. The idea that demonic words materialize from the air like dew recurs elsewhere. When the narrator describes how Belial, the most lewd and "gross" of all the fallen spirits, speaks, he alludes to the story from Exodus, wherein God feeds the Israelites bread from the sky:

his tongue

Dropped manna, and could make the worse appear
The better reason, to perplex and dash

Maturest counsels: for his thoughts were low;

To vice industrious, but to nobler deeds

Timorous and slothful: yet he pleased the ear.

(*PL*, 2.113-7)

The conceit caricatures Moses's identification of manna with God's word: "And he humbled thee, and suffered thee to hunger, and fed thee with Manna."[53] It also connects Belial's manner of speaking with the mechanism by which manna was deposited in the wilderness—condensation or precipitation of dew. In Milton's poem, this meteorological process poses an opportunity for latent powers of air to express or convey themselves into a more solid manifestation. Condensation simultaneously signifies devilish articulation and the straightforward natural mechanism by which demonic cloud or vapor becomes incorporate.

Although Milton's fallen angels eventually congregate in the midair, they are first expelled into the depths of Hell. In addition to assimilating the humid properties of their earthly locus, the devils therefore occasionally exude and embody their infernal environment, as Satan's famous exclamation—"Which way I fly is Hell; myself am Hell"—poignantly illustrates (*PL*, 4.75).[54] They are capable of reflecting both climates because of their likeness to air, which is composed of hot and cold exhalation. That the devils' meteorological identities persist in Hell is evident from the many meteorological figures applied to their infernal activities. Recall the simile comparing the devils' military

[53] Deuteronomy 8:3 (KJV).

[54] Recall that Satan is sometimes depicted as nitrous (*PL*, 4.815), thunderous (*PL*, 1.601), fiery (*PL*, 2.1013), and even sunny (*PL*, 1.594-6 and 2.492-5).

exercises to portentous wars "Waged in the troubled sky" by "airy knights," or the characterization of Sin and Death as "two polar winds blowing adverse / Upon the Cronian Sea," or, more vivid still, the notion that some spirits spend their rage on Hell's soil, tearing up its "rocks and hills, and ride the air / In whirlwind" (*PL*, 2.534, 2.536, 10.289-90, and 2.540-1). Many similar examples might be found, however, our present concern is the role of exhalations in Hell and their relationship to the devils.

Milton analogizes Hell's mineral-rich core and singed terrain to earth's Tartarean regions and smoking promontories, encouraging us to imagine the devils' torture chamber in geological terms (*PL*, 1.230-7, 1.684-8, 2.858, and 6.54). We are thus correct to think of Hell's ventilating winds as similar to the exhalations believed to suffuse the earth's crust.[55] Milton directly invokes the concept of exhalation to portray the material and acoustical qualities of the structure of Pandaemonium, which the devils build from their infernal environment:

> Anon out of the earth a fabric huge
> Rose like an exhalation, with the sound
> Of dulcet symphonies and voices sweet.
>
> (1.710-2)

Milton compares the completion of this monument, whose construction he likens to the bellowing of a pipe organ, with an exhalation to depict its builders as meteorological beings and to anticipate other moments in the epic when Satan will channel his breath into creating charming sounds. Exhalation comes into play, for instance, when Satan

[55] On the operation of the dry exhalation within the earth, see Taub, pp. 99-100.

simulates voices with the "organs" of Eve's imaginative faculties and the serpent's "[o]rganic" tongue (*PL*, 4.802 and 9.530). At these junctures, the narrator cites "inspir[ation]" (inblown air) as a possible agent of the implanted fraud (*PL*, 4.804 and 9.189). The inter-allusiveness of these three episodes underscores the role that Satan's meteorological being plays in conducting sin into the world. The bodies of Eve and the snake are activated by exhalation, just as the "pipes" of Pandaemonium fill up from "one blast of wind" (*PL*, 1.708-9). And, like their infernal counterpart, both Eve and the serpent serve as instruments for generating deceptive sounds. Eve's mind produces the "gentle voice" in her dream that she wrongly thinks belongs to Adam, and the serpent vocalizes Satan's false arguments for eating the forbidden fruit (*PL*, 5.36-7). A final indication that Satan's meteorological identity is at fault for spoiling Eden's climate and its acoustics is the fact that the "midnight" or "black" vapors in which he steals into Paradise and enters the snake are permanently installed in Eden after the Fall, manifesting in the "black air" that loudly echoes Adam's lament and clouds his judgment (*PL*, 9.159, 9.180, and 10.845-62).

Chapter 4: Satanic Acoustics in *Paradise Lost*

In the 1935 essay "A Note on the Verse of John Milton" T.S. Eliot claims that Milton's blindness "helped him to concentrate on what he could do best." This was, in Eliot's opinion, his ability to write superbly musical poetry.[1] But for Eliot the genius of his sound is also the sign of his poetic limitation. In his zeal for the aural, Milton neglects the other senses, producing imbalanced poetry where "the inner meaning is separated from the surface."[2] Eliot's backhanded praise of Milton's "auditory imagination" thus begins by echoing traditional acclaim for the "organ music" of Milton's blank verse before joining in the complaint of F. R. Leavis and Ezra Pound, who equated Milton's "orotundity" with mediocre poetry.[3]

---

[1] A version of this chapter is forthcoming in "'How cam'st thou speakable of mute': Satanic Acoustics in *Paradise Lost*," *Milton Studies* 57 (2016), which is published by Duquesne University Press. On the basis of "the single effect of grandeur of sound," Eliot finds that there is "nothing finer in poetry" than what Milton's achieves. "Milton I," in *On Poetry and Poets* (1957; reprint, New York: Farrar, Straus & Giroux, 1970), 158, 164. Originally printed in *Essays and Studies* as "A Note on the Verse of John Milton" (1935). Eliot means "best" in a both a personal and a relative sense (i.e. compared to other poets).

[2] The downside of what Eliot dubs Milton's "rhetorical style" is "that a dislocation takes place, through the hypertrophy of the auditory imagination at the expense of the visual and tactile, so that the inner meaning is separated from the surface, and tends to become something occult, or at least without effect upon the reader until fully understood." Ibid., 161-3.

[3] John Leonard's ample account of the "Milton Controversy" of the twentieth century and its roots in early Milton criticism, traces among other things fluctuating opinions of Milton's sonorous style. Leonard

Controversy over Milton's imposing sound effects has abated since Eliot's time. But we can still learn from his contention that Milton's blindness and musical inclination produced poetry that, above all, is acoustically imaginative. In the latter half of the twentieth century scholars conceded auditory genius in the sounds of Milton's words—in their syntactical arrangement, rhythm, alliteration, repetition, and so on—but few modern critics have sought evidence of his aural imagination in the figuration, characters, and larger narrative structures of *Paradise Lost*.[4] These, too, are Milton's inventions, which, along with his style of versification, reflect the poet's distinctive aural concerns.

Of all the notable acoustical features of Milton's epic, Satanic aurality stands apart because it is epitomized in the episode on which the narrative crisis depends. For the Fall to occur the serpent must speak. Before she eats the forbidden fruit, Eve's innocence is threatened by the sound of the serpent's speech, which "into her heart too easy entrance won."[5] The penetrating character of this acoustical attack can be attributed to the fact that "sound…for Milton…is unmistakably corporeal," as Beverley Sherry

---

identifies Daniel Webb's *Remarks on the Beauties of Poetry* (1762) as the first work of criticism to connect the sound of Milton's blank verse to organ music. In the 19th century, Leigh Hunt, Tennyson, and James Russell Lowell used the metaphor to discuss Milton's musical virtuosity. However, after Ezra Pound critiqued Milton for using highly latinized language, "the 'sonority' that had hitherto been seen as a virtue will be seen as a vice, and eulogies of Milton's 'organ music' will only harden the opposition." *Style and Genre*, vol. I of *Faithful Labourers: A Reception History of* Paradise Lost, 1667-1970 (Oxford: Oxford University Press, 2013), 59-265. For Leavis's disparagement of the pompous sound of Milton's poetry, see "Milton's Verse," *Scrutiny* 2 (1933), 126.

[4] Erin Minear's work on music in Shakespeare and Milton is an exception, in that it focuses on poetic representation of musical sounds rather than the "music" the poem itself performs; see *Reverberating Song in Shakespeare and Milton: Language, Memory, and Musical Representation* (Surrey, England: Ashgate, 2011).

[5] John Milton, *Paradise Lost*, ed. Alastair Fowler, 2nd edition (Harlow, England: Longman, 1998), book 9, line 734, p. 513. All quotations of *Paradise Lost* are from this edition and hereafter will be cited in the text by book and line number.

asserts.[6] Satan's identity as an aerial being who has a powerful sway over the atmosphere is certainly also at play. In Chapter 3, I argued that Milton associates Satan with the "prince of the power of the aire" mentioned in Ephesians 2:2 and uses this doctrinal point and its traditional elaborations to characterize the fallen angels throughout his epic poetry as powers of air and weather. Milton's depiction of the devils in *Paradise Lost* as elementally similar to, and manipulators of, the atmosphere anticipates their role in *Paradise Regained* as rulers of the postlapsarian middle air.[7]

Despite the basic physical connection between sound and atmosphere, scholars have failed to recognize the co-dependence in Milton's poetry of acoustical and meteorological representation. In a rare analysis of the air in *Paradise Lost*, Jayne Elizabeth Lewis connects its fall with the rise of what she calls "literary atmosphere" in the long eighteenth century. For Lewis, Satan's influence on the atmosphere of Paradise renders it analogous to the literary medium of Milton's poem: the fallen air becomes visible, material, and limitedly expressive.[8] This reading though valuable for its appreciation of literary atmospheric resonance, discounts the consistently acoustical nature of Satan's pneumatic incursions and ignores their meteorological genesis. I contend that the enigmatically mechanical and magical instruments Satan uses to produce deadly sounds prior to the temptation prefigure the method he uses to produce the serpent's voice and that these technologies arise directly from his meteorological agency.

---

[6] "Milton, Materialism, and the Sound of *Paradise Lost*," *Essays in Criticism* 60, no. 3 (2010), 224.
[7] Satan's "place" in the latter epic, for example, is described as the "mid air." *Milton: The Complete Shorter Poems*, John Carey, ed., 2nd ed. (Harlow, England: Longman, 2007), 426, line 39.
[8] *Air's Appearance: Literary Atmosphere in British Fiction, 1660-1794* (Chicago: The University of Chicago, 2012), 36-40, 53-4.

The episodes in Books 4 and 9 wherein Satan causes Eve to dream and the serpent to speak contain clues as to how Satan uses his meteorological power to produce acoustical deceptions. When Satan is discovered at Eve's ear, "assaying by his devilish art to reach / The *organs* of her fancy" the narrator uses an acoustical pun to imagine one of the possible routes into her mind (4.801-2; italics added). Eve's fancy is an organ being played by Satan. Arguing that the "possibility of sin" enters the world through a voice that cannot be assigned singly to Satan, Stephen Hequembourg finds "no ground for asserting that Satan spoke, scripted, or serenaded" when he attempts to suborn Eve.[9] True, the text provides no evidence that Satan transfers verbal matter into Eve's mind, but there are compelling reasons to think that Satan subjects her to noxious sound when he manipulates the organs of her fancy to "forge / Illusions as he list, phantasms and dreams" (4.802-3). Milton places the Devil at Eve's ear (what other kind of sensation passes through the ear but sound?), and the forgery he applies to her imaginative "organs" suggests the forge bellows used to power said instruments.[10] With the serpent, Satan reduces himself into "a black mist" and goes "in at his mouth" (9.180, 187). Notably, in describing each moment, the text outlines two possible explanations of Satan's manipulations. Eve's dream is described as being engendered either by the organ-like action of the fancy *or* by the more direct influx of "inspiring venom"; similarly, the snake speaks either by "serpent tongue / Organic, *or* impulse of vocal air" (4.804; 9.529-

9 "Milton's 'Unoriginal' Voice: Quotation Marks in *Paradise Lost,*" *Modern Philology* 112, no. 1 (2014), 159.

10 "Forge bellows" were used to supply air to pipe organs, replacing more fragile animal bladders with a technology originally intended for stoking fires; see Douglas Earl Bush and Richard Kassel, *The Organ: An Encyclopedia* (New York: Routledge, 2006), 63.

30; italics added). By offering these alternatives, Milton implies that Satan has the ability to affect sounds by instrumental means, via *organs*, or more directly, with his bodily likeness to air.[11]

Organs had a deep personal significance for Milton. John Aubrey records that he "had an organ in his house; he played on that most."[12] Outside of his home, Milton might have heard the music of John Tomkins, who played the organ at St. Paul's and was likely an associate of the elder John Milton, or that of the famous organist Frescobaldi, whom he could have heard while in Rome, mixing in the society of Cardinal Francesco Barberini.[13] Growing up the son of a composer no doubt afforded him ample exposure to the instrument. Milton seems to have taken some interest in the organ's history, noting in his commonplace book when it was first brought to France.[14] Not surprisingly, then, in *Of Education* the organ is twice recommended as an instrument that should be played after dinner for "recreating" the spirits.[15]

That the poet grew up around organ music and was himself an organist goes a long way to explain why the instrument is a recurring figure in Milton's epic; but another

---

[11] The word "inspire" is used to characterize Satan's transformation of the serpent's "brutal sense" into intelligent faculties, and, in Book 4, to describe one the possible methods by which Satan implants Eve's dream (4.804, 9.187-8). That Milton uses this verb, which denotes blowing or breathing into, to depict the moment of contamination in both episodes indicates that the conveyance through which Satan physically accesses and influences God's creatures is aerial.

[12] "Minutes of the Life of Mr. John Milton," in *The Complete Poetry and Essential Prose of John Milton*, ed. William Kerrigan, John Rumrich, and Stephen M. Fallon (New York: The Modern Library, 2007), xxvii.

[13] Sigmund Spaeth, *Milton's Knowledge of Music* (Princeton University Library, 1913; Ann Arbor: The University of Michigan, 1963), 16, 16n4, 22. I use the 1963 reprint.

[14] "Organs first in France. The ambassadors of the Greek Emperor Constantine brought King Pepin some organs, which had never before been seen in France." John Milton, *The Complete Prose Works of John Milton*, ed. Don M. Wolfe (New Haven, CT: Yale University Press, 1953–82), 1:383.

[15] Milton, *The Complete Prose Works*, 2:410.

rationale lies in the word's multiplicity of meanings. The concept of an organ encompasses musical, biological, and mechanical senses. In Milton's time the word might denote a pipe, a specific body part, or any kind of mechanical instrument, such as a piece of artillery.[16] All of these senses are at play in Milton's descriptions of the bodily mechanisms through which Satan manipulates Eve and the serpent. The phrases "organs of her fancy" and "serpent tongue / Organic," which clearly designate the bodily sensitive faculties that receive Satan's attempts, also represent Eve and the serpent as Satan's musical instruments and machines. As we shall see, the organ is a leitmotif that connects and unites the musical, mechanical and bodily apparatuses by which Satan spreads rancor and deceit.

I. THE SATANIC PROPERTIES OF "SONOROUS METAL"

Almost immediately in Book 1 the fallen angels exhibit their command over both instruments and the atmosphere. Hell's "dusky air," attracts and disburdens them (1.226). It bears Satan's "unusual weight" when he climbs out of the flaming lake and later is pumped through flutes and recorders "blowing martial sounds" (1.227, 540). "Breathing united force with fixed thought," the angels march silently along to piped music that "charmed / Their painful steps o'er the burnt soil" (1.560-2). They are revived not only by air and music, but also by metals. Instrumental metal described as "sonorous" rouses the soldiers into a martial mood, and they lift their glinting weapons on high:

[16] *Oxford English Dictionary*, s.v. "organ, n.1," accessed September 3, 2015, www.oed.com.

Ten thousand banners rise into the air
With orient colors waving: with them rose
A forest huge of spears: and thronging helms
Appeared, and serried shields in thick array
Of depth immeasurable.

(1.540, 545-9)

Finally, when they raise their imperial ensign, the "warlike sound / Of trumpets loud and clarions" rings out (1.531-2).

The striking prevalence of metals in this scene and the emphasis on their contact with air is intriguing. Why does Milton go to such lengths to enumerate the devils' weapons and surround them with blowing music, breath, and the billowing wind overhead? The musical breezes that surround and permeate the defeated but respiring rebel angels portend their future status as rulers of the postlapsarian air. But the question of the metals remains. Aristotle attributes the generation of metals to the submersion beneath the ground and condensation of certain vapors that he calls exhalations. He conjectures that exhalation turns to metal through cooling and by coming into contact with rocks.[17] By Aristotle's logic, then, metal should emerge from the devils' contact with Hell's rocky surface, since, as spirits of air, the fallen angels resemble exhalations

[17] "The moist exhalation, then, is the material of the metals. Along with portions of the dry exhalation it is trapped underground, where it condenses, particularly if it comes into contact with rocks, and then hardens, probably through cold. […] Because the metals contain earthy matter, they cannot revert to water, and for the same reason they are, with the exception of pure gold, affected by fire" (paraphrase of Aristotle's theory from *Meteorologica* in D. E. Eichholz, "Aristotle's Theory of the Formation of Metals and Minerals," *The Classical Quarterly* 43 [1949], 143).

trapped beneath the ground.[18] They are likened to dense vapor when Satan, summoning them off the burning lake and onto "firm brimstone," is compared with Moses calling up the locusts over Egypt in a "pitchy cloud" (1.340, 350). The demons are, therefore, surrounded by metal instruments as a consequence of their moving like a front of vaporous air through Hell's climate. The comparison of their flag with "a meteor streaming to the wind" prefigures their meteorological potential and plans for atmospheric domination (1.537).

The devils play an active role in constructing their capitol by extracting, refining, and recasting its gold material (1.700-7). The conceits used to describe these activities imply that the devils are materially present in the structure of Pandaemonium, which as they build they infuse with their spirituous being:

> As in an organ from one blast of wind
> To many a row of pipes the soundboard breathes.
> Anon out of the earth a fabric huge
> Rose like an exhalation.
>
> (1.708-11)

The first simile implies that the fallen spirits are the organ-blowers who pump the "blast of wind" through the organ-like mold. But as flexible powers of air, the spirits are also

[18] There was some disagreement about how metals came to be. While many Renaissance theorists thought that metals were derived from some combination of mercury, sulphur, and nitre, other seventeenth-century explanations identified exhalation as their primary ingredient. Harinder Marjara explains that the main ingredients thought to be involved in generating metals changed over time. In the early Renaissance alchemists believed that sulphur and mercury were responsible for the formation of metals; later, in the seventeenth century, sulphur and nitre were the preferred combination; see *The Contemplation of Created Things: Science in* Paradise Lost, 172-78.

materially associated with the fluid substance that passes like wind through its pipes and hardens into the metal walls of the palace. The second simile solidifies this connection. The meteorological image of "exhalation" explicitly identifies the demons with their edifice. The golden, metallic fabric of Pandaemonium is *like an exhalation* because it was made by exhalation-like beings and is affiliated with their substance (1.703).

By implying a physical relationship between air, gold, and the pipe organ's music, Milton was elaborating an ancient theory that attributed the sonority of metals to their porous and aerated internal structures.[19] Albertus Magnus believed that gold, silver, and copper are better sounders than other metals because they contain a superior balance of "subtle water and subtle earth," and also, a substantial amount of vapor.[20] Albertus writes, "For this reason these metals are strongly resonant and retain the sound for a long time, because they are full of air, and, when vibrating as a result of a strong blow, they continuously expel air from themselves."[21] By alluding to the airy, exhalation-like properties of the gold used to construct Pandaemonium, Milton therefore underscores its function as an acoustical space, productive of sweet music and the charming sound of the devils' political rhetoric.

---

[19] Pietro d'Abano links sonority to the inward structure of metal. Similar discussions appear in the pseudo-Aristotelian *Problemata* and the *Quaestiones* of Nicolaus Peripateticus; see Charles Burnett, "Sound and its perception in the Middle Ages" in *Studies in Hearing and Musical Judgement from Antiquity to the Seventeenth Century*, eds. Charles Burnett, Michael Fend and Penelope Gouk (London: The Warburg Institute, 1991), 51, note 70.

[20] Ibid., 51.

[21] "Et ideo ista sonora sunt vehementer et dui retinent sonum, eo quod aëre plena sunt, quae trementia ex ictu forti continue a se expellunt." Albertus Magnus, *Opera omnia*. Vol. 7, *De anima*, ed. Clemens Stroick (Münster, Germany: Monasterii Westfalorum in Aedibus Aschendorff, 1955), 2.3.17.27-9, p.124; translation by Charles Burnett, "Sound and its perception in the Middle Ages," 51.

II. Spirits, Magic, and the Early Modern Instrument

That pipes, recorders, trumpets and clarions are so intimately connected with the demonic nature is puzzling, especially since similar wind instruments appear in Heaven's symphonies.[22] More baffling still is Milton's use of the pipe organ—his favorite instrument—to characterize the construction of Pandaemonium where Satan and his followers plot the Fall. Milton's closeness to the instrument may have uniquely positioned him to appreciate what might be characterized as its central deception, that a single operator may, with relative ease, create and control a gigantic, almost unearthly sound. While susceptible to the sublime power of the organ's sound, the organist is always perfectly aware of its cause: an elaborate network of bellows, tanks, stops, and pipes that transform and amplify the machine's initial source of air. Because the organ's miraculous sound is actually highly engineered—Marin Mersenne called the instrument "one of the most admirable pneumatic machines ever invented"—it aptly symbolizes the artifice of satanic acoustics.[23] A central implication of the organ simile, therefore, is that Satan's impressive-sounding transformation of Hell's soil is achieved through artifice or workmanship.

This may have aroused contempt from some of Milton's early readers. The study of mechanics had long been deemed too menial to classify as a liberal art. When John Wilkins published *Mathematical Magick* in 1648, he lamented the persistent bias against

[22] For instance, on the first Sabbath "the solemn pipe, / And dulcimer, all organs of sweet stop" join the voices of Heaven in a hymn of Creation (7.595-6).
[23] *The Books on Instruments*, trans. Roger E. Chapman (The Hague, Netherlands: Martinus Nijhoff, 1957), book 6, p. 391. These books are part of the larger work, *Harmonie Universelle* (1636-37).

practical or artificial (as opposed to divine or natural) investigations in philosophy and declared they should be treated "with greater industry and respect, than they commonly meet with in these times."[24] Milton's comparison of the fallen angels with organ builders, then, may be read as an insult and a reflection of their demoted metaphysical status. That Milton has Mammon, "the least erected spirit that fell," lead the excavations for the building project expresses the low standing of the mechanical arts (1.679).

In addition to disparaging the devils' accomplishment, the analogy of Pandaemonium to a mechanical pipe organ associates their work with magic. The confusion of mechanical operation with magic was so commonplace that Wilkins ironically references this error in the title of his book: "This whole Discourse I call *Mathematical Magick*, because the art of such Mechanical inventions as are here chiefly insisted upon, hath been formerly so styled; and in allusion to vulgar opinion, which doth commonly attribute all such strange operations unto the power of Magick."[25] His point is that geometry or applied mathematics, rather than magic, lies behind the marvels that philosophers of old veiled "under such mystical expressions, as might excite the peoples wonder and reverence, fearing lest a more easie and familiar discovery, might expose them to contempt."[26] Magic, whether genuine or purported, is employed in the construction of Pandaemonium. Its indoor lamps are suspended by "subtle magic" and the foundations are laid with "wondrous art" and "strange conveyance" (1.703, 706, 727).

---

[24] I use the second edition: John Wilkins, *Mathematical Magick: or, the Wonders That may be performed by Mechanichal Geometry. In Two Books.* (London, 1680), 10. For the distinction between divine, natural, and artificial sciences, see pp. 1-2.
[25] Ibid., A4r.
[26] Ibid., 3-4.

These phrases obscure the devils' actual means of accomplishing their engineering feats, just as the ancient philosophers in Wilkins' account veiled their arts in secrecy. But the organ simile, by openly discussing the instrument's mechanism, is forthcoming about the constructedness of Hell's temple. Milton's use of the alternative strategies of veiling and revealing to describe the devils' assembly of their capitol building is calculated. By integrating simile with direct representation and layering allusions to magic with detailed accounts of the demons' engineering techniques, he keeps the precise nature of satanic industry ambiguous. The devils' powers are truly magical in that they utterly excel the industry of human beings, and yet their reliance on artifice or craft reminds us that their abilities are less than divine and undeserving of admiration.[27]

If the entanglement of magic and mechanism in Milton's description of Pandaemonium betrays something like Wilkins's skepticism of the occult, it also paints an unflattering picture of the acoustical machines that show up in his book. Milton's representation of Hell's instruments as responsive to forces implicit in the environment is neither an original nor purely fictional idea for his time. In *Mathematical Magick* Wilkins mentions an automatic virginal that, much like Satan's instruments, generates sound through its clever engineering and the application of meteorological power. This device, attributed to the inventor Cornelius Drebbel (1572-1633), apparently played music when placed in the sun and would cease to play when removed from it. "The warmth of the sun," Wilkins explains, "working upon some moisture within it, and rarifying the inward air unto so great an extension, that it must needs seek for a vent or issue, did thereby give

[27] The inconceivably swift construction of Pandaemonium outfaces man's greatest building feats (1.692-9).

several motions unto the instrument.[28] He discusses other automata that could make meaningful sounds, giving the oft-cited examples of medieval magician Roger Bacon's "brazen head" and the speaking statue of Albertus Magnus.[29] Rather than affirming or denying such legends, Wilkins, for whom developing alternative methods of communication became a lifelong fascination, ponders the practical means by which machines might be made to speak.[30] A few years after *Mathematical Magick* was published, John Evelyn recorded in his diary that Wilkins, whom he visited at Wadham College, had invented a speaking statue of his own.[31] Since *Mathematical Magick* includes a lengthy, illustrated account of the Chinese "sailing Chariot," a vehicle that appears in *Paradise Lost* as a figure for the kind of dexterity Satan must use as he traverses the unstable surface of the *primum mobile*, it might conceivably have influenced

[28] *Mathematical Magick*, 148-9. See also Penelope Gouk, *Music, Science and Natural Magic in Seventeenth-Century England* (New Haven and London: Yale University Press, 1999),168.
[29] An account of Bacon's brazen head may be found in the Elizabethan play *The Honourable History of Friar Bacon and Friar Bungay* by Robert Greene. Albertus's statue is discussed by Matteo Corsini in *Rosaio della Vita* (1373) and in other medieval sources. The legends of these articulate machines derive from a long oral and written tradition in Eastern and Western cultures featuring oracular heads. Other famous examples of such heads are the artificial divinatory head of Gerbert (Pope Sylvester II) and the brass head of twelfth-century Oxford scholar Grosseteste. The artificial heads in this tradition were mostly metal, usually brass, and were often thought to involve a pact with the devil, or to contain the Devil or a demon who spoke from within. See Arthur Dickson, *Valentine and Orson: A Study in Late Medieval Romance* (New York: Columbia University Press, 1929), 200-16.
[30] See *Mathematical Magick*, 177-8. Wilkins conjectures that a precise investigation of naturally occurring phonemes and the linguistic movements of the mouth would be necessary to mechanically reproduce human speech. For Francis Bacon's treatment of the same problem see *Sylva Sylvarum* in *The Works of Francis Bacon*, edited by James Spedding, Robert Ellis, and Douglas Heath, vol. 2 of 14 (London: Longman and Co., 1857), 413, § 199-200.
[31] See the entry dated July 13, 1654 in *The Diary of John Evelyn*, ed. William Bray (Washington [D.C.]: M. Walter Dunne, 1901), 298. Wilkins devoted an earlier work, entitled *Mercury, or, The secret and swift messenger : Shewing, how a man may with privacy and speed communicate his thoughts to a friend at any distance* (1641), to recording various methods of encrypting or concealing messages, and his *magnum opus*, *An Essay towards a Real Character, and a Philosophical Language* (1668), proposed a full-fledged universal language.

Milton's characterization of Satan.[32] Milton's representation of Satan as a mechanical savant who will reengineer the serpent's anatomy in order to make it speak, caricatures the schemes that Wilkins and others conceived for developing speaking machines.

By equipping the devils with instruments, and thus calling our attention to the mystical relation between metal, sound, and air, Milton satirizes religious and philosophical traditions that actively attempted to exploit this relationship through magical or idolatrous means. We have already seen from the natural philosophy of Albertus Magnus, which posited acoustical sympathy between the porous structure of metal and the surrounding air, that the aerial and meteorological bodies of Milton's devils are implicated in the very material of their instruments. But the Church promulgated another acoustical theory that alienates demonic spirits from consecrated metal. Catholic ceremonies for "baptizing" church bells, a practice that dates at least to the eighth century, claimed to imbue them with sounds capable of repelling Satan and his agents of weather.[33] According to the service for the benediction of bells in the 1595 Roman Pontifical of Clement VIII, after bathing and anointing the bells with the sign of the cross, the Bishop would ask for the following blessing:

> And when its melody shall fall upon the ears of the people, may they receive an increase of Faith; may all the snares of the enemy, the crash of hail-storms, hurricanes, the violence of tempests be driven far away; may the deadly thunder be weakened, may the winds become salubrious, and

[32] For sailed wagons in *Paradise Lost*, see Book 3, lines 438-9. Wilkins's discussion of these contraptions occurs in Book 2, Chap. 2, pp. 154-62.
[33] H. B. Walters, *Church Bells of England* (London: Henry Frowde, 1912), 256-7.

be kept in check; may the right hand of Thy strength overcome the powers of the air, so that hearing this bell they may tremble and flee before the standard of the holy cross of Thy Son depicted upon it.[34]

Medieval and early modern church bells across Europe bore inscriptions that echo this challenge to the "powers of air."[35]

Verses from the late fifteenth-century bell tower at Gulval Church, Cornwall, for instance, declared that its pealing bells had the power to banish whatever conceivable forces—banal, meteorological, or demoniacal—might impede one from attending church:

Who hears the bell, appears betime,
And in his seat against we chime.
Therefore I'd have you not to vapour,
Nor blame y^{e} lads that use the Clapper,
By which are scared the fiends of hell,
And all by virtue of a bell.[36]

Belief in the virtuous sound of church bells encouraged many parishes to ring them during thunderstorms.[37] Well into the nineteenth century, Longfellow dramatized this

[34] "Et cum melodia illius auribus insonuerit populorum, crescat in eis devotio fidei; procul pelantur omnes insidiæ inimici, fragor grandinum, procella turbinum, impetus tempestatum; temperentur infesta tonitrua; ventorum flabra fiant salubriter, acmoderate suspense; prosternat aëreas potestates dextera tuæ virtutis; ut hoc audietes tintinnabulum contremiscant, & fugiant ante sanctæ crucis Filij tui in eo depictum vexillum…." *Pontificale Romanum Clementis VIII* (Paris, 1615), 299. See also Rev. J. S. M. Lynch, *Rite of the Blessing of a Bell, or of Several Bells, According to the Roman Pontifical* (New York: The Cathedral Library Association, 1912), 23.

[35] White, *A History of the Warfare*, 345.

[36] Walters, *Church Bells of England*, 263; see also the entry on the parish of Gulval in Joseph Polsue, *A Complete Parochial History of the County of Cornwall*, vol. 2 (Truro: William Lake, Boscawen Street, 1868), 115-117. For the dates of the bell tower construction see J. Charles Cox, *Cornwall* (London: G. Allen & Company, ltd., 1912), 118.

custom in the prologue to *The Golden Legend*, which imagines the bells of Strasbourg Cathedral defending the church against Lucifer who attacks in the form of a storm. His thwarted "Powers of the Air" complain,

> All thy thunders
>
> Here are harmless!
>
> For these bells have been anointed,
>
> And baptized with holy water!
>
> They defy our utmost power.[38]

The structure of Pandaemonium resembles these parish bells materially and symbolically. Made with the resonant material of gold and compared with an exhaling pipe organ, the "arched roof" of Satan's temple is designed to reverberate like a bell (1.726). The freshly christened appearance of Satan's temple, "new rubbed with balm," corresponds with the custom of applying holy water and oil to the consecrated bells (1.774).[39] Similarly, the palace's pneumatic origins, in a hill that emanated "fire and rolling smoke," recall the ceremonial practice of fumigating *campanae* with incense (1.671).[40] Like the "thick" and "airy crowd" of spirits who miraculously fill the palace as if they are fairies making "jocund music," fumes of incense flow into the bell during *its* inaugural ceremony, and invest it with talismanic, acoustical power (1.775, 787).

---

[37] Walters cites several church records that provide for bell ringing in the time of dangerous storms; see *Church Bells of England*, 262.
[38] Henry Wadsworth Longfellow, *The Golden Legend* (London: David Bogue, 86, Fleet Street, 1854), 1-2.
[39] Lynch, *Rite of the Blessing of a Bell*, 22.
[40] William Smith and Samuel Cheetham, eds., *Dictionary of Christian Antiquities*, vol. 1 (London: John Murray, Albemarle Street, 1876), 185.

And yet, the moral function of the bells of Christendom is diametrically opposed to that of Pandaemonium, however structurally similar they are to Satan's palace. The acoustical properties of Satan's temple consolidate and reinforce his power over the air, rather than dispersing it as the bells were supposed to do. Acting as a literal sounding board for the devils' machinations, the acoustics of Pandaemonium invert the apotropaic effects usually ascribed to pealing church bells or similar metal instruments like the ancient Roman *tintinnabulum* (demon-repelling wind chimes).[41] This key difference gives Milton's invention satirical energy. Without denying that "sonorous metal" can influence atmospheric phenomena, Milton uses Pandemonium to subtly critique those who employ musical instruments to subdue or control the spirit world. If Satan's power is augmented by acoustical metal, then the belief that its properties inhibit him is both ludicrous and deeply immoral.

Besides the Catholic clergy, other potential targets of this satire include Paracelsian alchemists like Heinrich Khunrath (1560-1605) whose major alchemical treatise *Amphitheatrum Sapientiae Aeternae* was published posthumously in 1609. Penelope Gouk has argued recently that Khunrath and his circle regarded instrumental music as essential to alchemical practice because it enabled the philosopher to improve

[41] In ancient Rome and Greece livestock, warriors, and the deceased were all adorned with bells to ward off predators and evil-doing spirits. Satis N. Coleman, *Bells: Their History, Legends, Making, and Uses* (Chicago: Rand McNally & Company, 1928) 26-28. On *tintinnulabum*, the protective symbol of the phallus was often displayed along with bells. An excellent example of these protective chimes appears in Patricia Simons, *The Sex of Men in Premodern Europe: A Cultural History* (Cambridge: Cambridge University Press, 2011), 55-56.

his spiritual health and more successfully commune with God.[42] "Particular musical instruments were thought to provide access to the human *spiritus* through their harmony, a process that made it possible to restore balance between body and soul, and especially to alleviate melancholy."[43] Not only can music refresh the alchemist, whose soul was particularly susceptible to melancholia, it also protects him from evil spirits.[44] The enthusiasm for instrumental music that obtained in Paracelsian alchemical circles around 1600 sheds light on the Miltonic phrase "sounding alchemy" (2.517). This obscure phrase is usually interpreted as a synecdoche for Hell's trumpets, but it also likely alludes to the mystical belief that music and alchemy are mutually necessary for achieving superior health and spiritual understanding.[45] Milton's usage does not reflect positively on the aims or efficacy of this type of alchemy. Surrounded by rousing music issuing from alchemically and meteorologically forged instruments, Satan is analogized to the magus who uses music to rejuvenate his melancholic soul and increase his spiritual prowess. Because Hell's music emboldens Satan and his followers rather than impeding them, Milton implies that warding off evil with musical instruments may be a hubristic and futile practice.

Part demonology, part satire, the description of the demons' acoustical activities in Book 1 reveals vital information about the satanic production of sounds, often through

[42] Penelope Gouk, "Transforming Matter, Refining the Spirit: Alchemy, Music and Experimental Philosophy around 1600," *European Review* 21, no. 2 (2013) 147-9, 155-6.
[43] Ibid, 155.
[44] Gouk observes that Khunrath and Agrippa both hold sacred harmony as a deterrent to evil. She translates the inscription in the an engraving entitled "Lab-Oratorium" from Khunrath's *Amphitheatrum sapientiae aeternae* (1595) depicting an assortment of stringed instruments in the middle of an alchemist's laboratory, as follows: "Sacred Music is the dispeller of sadness and evil spirits, because the Spirit [SPIRITUS] of Jehovah gladly sings in a heart filled with pious joy"; see "Transforming Matter," 151.
[45] Gouk, "Transforming Matter," 146-7, 149, 155-6.

ironical allusion to manmade acoustics. We are shown that the devils' meteorological power and mechanical skill are physically realized in their instruments, while subtly reminded that there are men who also use instruments devilishly, with divine pretensions or technological hubris. Yet, more than simply parodying those who make idols of their instruments, the passages from Book 1 shed light on the ontology of satanic acoustics. Readers learn that Satanic sounds are instrumental—they pass through and are transfigured by some kind of device—and that metal instruments in particular, whose very fabric and resonating cavity were each thought to contain air, are prone to satanic appropriation. The devils make the counterfeiting of sweet, sublime, and finally, human sounds the mainstay of their ongoing rebellion. Instruments or instrument-like mechanisms enable them to convert meteorological resources into deceptive sounds like the "dulcet symphonies and voices sweet" that waft out of the pipe organ-like structure of Pandaemonium and the words that mysteriously emerge from the serpent's "organic" tongue (1.712).

Much of the writing on instruments in the seventeenth century did not engage with or endorse the possibility of spiritual participation in instrumental sound.[46] Milton's consideration of the demonological implications of wind-powered instruments stands in contrast to, for instance, their representation by the leading authority on instruments in his day, the French experimentalist and scholar of music, Marin Mersenne. But Milton's characterizations of satanic acoustics often echo Mersenne's scientific observations on

---

46 Michael Praetorius' treatise on instruments is a classic example. See *Syntagma Musicum*, trans. and ed. David Z. Crookes, vol. 2, *De organographia* (Oxford: Clarendon Press, 1986). *De organographia* was first published in Wolfenbüttel in 1618 and 1619.

the interaction between the instrument and the air. As we shall see, the main difference between their accounts lies in Milton's allowance that the movement of the wind within instruments may be magically or spiritually empowered.

Mersenne's *Harmonie Universelle* (1636) exceeded any study ever before published in documenting musical instruments—their sounds, appearance, specifications, range, construction, etc. The books on instruments in the *Harmonie Universelle* are illustrated with detailed woodcuts representing a wide array of examples from European courts, but also from homelier traditions and non-Western places. Mersenne's work quickly became known in England, partially through the writings of Descartes and Gassendi, and his acoustic propositions now known as "Mersenne's Laws" were rapidly accepted possibly because they upheld an idea shared by many adherents of the mechanical philosophy, that "the universe was constructed according to harmonic principles expressible through mathematical laws."[47] Mersenne's explanation of musical consonance, for example, referred to today as the "coincidence theory" of consonance, proves that the perception of pleasurable musical sounds has a mathematical basis that can be verified by empirical observation.[48] Just as Mersenne's elegant mathematical descriptions of vibrating strings were the fruits of extensive experiments, his descriptions of instruments display an impressive depth of firsthand knowledge. Mersenne's books on wind instruments and the organ are most relevant to our discussion of satanic instrumentation in *Paradise Lost.*

---

[47] Gouk, *Music, Science and Natural Magic*, 176.
[48] Ibid.

Mersenne begins his analysis of wind instruments with a definition of wind, which, he says, is "nothing but movement of the air."[49] The air itself, however, proves less easy to define. He cites two quite divergent ways of thinking about the air: one is to measure it by its purity, which is most perfect above the vaporous layer of atmosphere that directly surrounds the Earth. The second way of defining the air is to think of it as including the mixture of vapors present in the atmosphere.[50] This is the position Mersenne himself seems to adopt:

> But it is more likely that the air is continuous from the earth up to the firmament, and perhaps beyond that to infinity of where it has pleased God to extend it, and what we breathe is different from the other only in that it has many heterogeneous bodies mingled in it, which are called vapors and exhalations, which are perhaps around the moon, the sun and the stars, as around our earth, which we would place among the planets, were we in the sun or Mars.[51]

Mersenne extends to organisms his rather radical assumption that planets have atmospheres similar to that of Earth. "The body of each animal exhales a certain quantity of vapors all about itself, which make its atmosphere."[52] (Plants are included in this proposition as well).[53] Milton mirrors this thinking in his depiction of the fragrant "air"

---

[49] Mersenne, *The Books on Instruments*, 294. See note 28 for edition.
[50] "[The air] can be considered in two ways, that is according to its purity, and with the mixture of the vapors and exhalations which are ordinarily contained in the atmosphere or the expanse which receives the vapors." See Mersenne, *The Books on Instruments*, 294.
[51] Ibid., 295.
[52] Ibid.
[53] From the idea that animals have personal atmospheres, Mersenne says, "can be drawn the reason of several particular qualities of plants and animals which harm the health, as it happens that the rotten grape spoils the others," see *The Books on Instruments*, 295.

that surrounds Eve, the "spirits odorous" exhaled by flowers and their "airy" leaves, and the "worlds and worlds" that Satan and Raphael pass by on their way to Earth—seemingly balmy planets that Milton compares with "happy isles, / Like those Hesperian gardens famed of old, / Fortunate fields, and groves and flowery vales" (5.268, 481-2, 567-9; 9.425, 59). Since moisture and exhalation are so prevalent in micro- and macrocosmic atmospheres, they cannot be inimical to the playing of instruments. Indeed, Mersenne claims "it is certain that the instruments (of which we are speaking) are able to sound with every sort of wind, whether it comes in as the simple motion of air, as that of the bellows which serve organs and musettes, or whether it is mixed of vapors and water, like that of the mouth, which is so full of moisture that the reeds and tubes of the instrument become all damp and wet."[54] This description recalls Milton's ambiguous account of Eve's dream, which portrays the Devil as either using the "organs of her fancy" like a bellow or breathing venomous fluid into her ear.

Mersenne's discussion of the wind used to sound instruments also bears directly on Milton's representation of the devils as makers and users of instruments. Mersenne states that instrumental sound can be made "in all the reaches of the air," and likewise in *Paradise Lost* we find it in Hell, Earth, and in Heaven. But vaporous wind, the kind we breathe, has a special effect on the musical device.[55] It does not merely pass through the instrument to make it sound; rather, moist air in entering the instrument deposits itself in its parts and mingles with them ("the reeds and tubes of the instrument become all damp

[54] Ibid., 294.
[55] Ibid., 294-5.

and wet"). Mersenne's view that the air is full of vapor generated by the environment and by organisms—and that this humid air may serve as the wind within instruments, sounding and saturating them all at once—underpins a key aspect of satanic acoustics in *Paradise Lost*. It illustrates the physics, though not the supernaturalism, behind the idea that demonic winds merge with and blur into instrumental formations themselves. Mersenne's image of moisture from the musician's body depositing itself in and mingling with the instrument recalls the confusion of the fallen angels' breath with their martial instruments as well as their exhalation-like bodies with the animating wind inside Pandaemonium.

Mersenne prefaces his book on wind instruments with so thorough a consideration of the nature of air because he takes seriously the identity between the moving air within musical instruments and the ambient air found in the atmosphere. The winds that operate flutes and organs, in other words, are the same winds that swirl around us, cause storms, and dive underground. This identity makes it possible to rationalize apparently numinous voices of Nature as the soundings of either naturally occurring or artificially contrived instruments: "There could be related the different caverns, pits, an other subterranean places which sometimes produce harmonious sounds, and at other times confused, horrible, and dreadful noises, to this sort of instruments."[56] The famed acoustical marvels of the ancient world, singing bronze birds, noise-making statues, and the oracles are "done by means of pipes, canals and winds."[57] In fact, every anthropomorphic sound we

[56] *The Books on Instruments*, 383.
[57] Ibid.

think we hear when no one is there ("the cry of the baby or the song of bird, the concert of viols, the noise of tambourines") is due to the fact that the winds imitate instruments as they strike landscapes and structures ("rocks, walls, window holes").[58] Mersenne is a thorough rationalist who wishes to draw back the curtain on prodigious sounds that seem to be the work of supernatural or magical agency by attributing them instead to mechanism: the interaction of matter and movement. But Milton's motives in portraying fallen acoustics are distinctly theological and mythologizing. While he integrates mechanistic explanation into his accounts of acoustics, he also allows sound to be generated and affected by spiritual agents, as we saw in *Comus*. Each of the parts that are requisite for the mechanistic production of sound in Mersenne's view—wind and instrument—are also present in Milton's acoustics. But Milton permits that either one or both of these elements may be demonically possessed, whereas Mersenne bars such influences from entering his descriptions altogether. The wind is always just the wind for Mersenne, but for Milton it is sometimes a spirit.

The physical similarity between accidental instruments (found in Nature) and those that are artificially constructed enables Mersenne to dispel the idea that sound has occult properties, but it serves the opposite purpose for Milton. That the devils make and play instruments in Hell haunts descriptions of accidental, naturally occurring sound effects, so that descriptions of the howling wind cannot but be read as the expression of demonic being. The rocks and crevices that catch the wind in Mersenne's explanation are

[58] Ibid.

analogized in *Paradise Lost* to the cavities of Pandaemonium's "organ" that resound with the demons' voices. After Mammon says his piece at the great council,

> such a murmur filled
> The assembly, as when hollow rocks retain
> The sound of blustering winds, which all night long
> Had roused the sea, now with hoarse cadence lull
> Seafaring men o'erwatched, whose bark by chance
> Or pinnace anchors in a craggy bay
> After the tempest
>
> (2.284-90)

The cavernous structures in this simile, the "hollow rocks" and "craggy bay," repercuss the "blustering winds" of the tempest, just as Mersenne says "different caverns, pits, and other subterranean places" can sometimes behave like wind instruments. Yet all of the details in Milton's vignette—the rocks, the bay, the "hoarse cadence," the winds and the tempest—do more than simply represent the latent acoustical capacity of nature. They also allude to aspects of demonic acoustics. The simile's implications are multiple: the applauding devils embody the sounding winds (the "hoarse cadence") inside instrument-like formations such as Pandaemonium; they act like instruments themselves ("hollow rocks") retaining and now expelling air at the appointed time; and while they themselves can cause winds to bluster, they may also temper and dissimulate the sound of wind with instrumentation. This conceit thus tellingly prefigures how all aspects of Earth's satanically compromised environment—not only its winds and vapors, but also its

geological formations, such as the underground spring through which Satan re-enters Paradise—may be implicated in or transformed into his instruments (9.71-73).

The nautical imagery and allusions to drowsiness in the passage recall the liquid quality of Circean music, which, as we saw in Chapter 2, disposes listeners to relax and even to lose their senses. The sailors it depicts unwisely find rest in the repercussions of the waves, foreshadowing Eve's yielding to the serpent's words by "much marveling" at sound of his voice (9.551). Because the echoes of the storm and the animal's speech come from familiar environmental sources, they seem harmless enough. But all of these satanic sounds have been modified with hollow, organ-like instruments that enable them to magically captivate listeners without arousing fear or suspicion.

III. Devils and Cannons, "implements of mischief"

Raphael's account in Book 6 of the Satan's rebellion in Heaven suggests that instrumentality may be a direct symptom of the fallen angels' sin. As we saw in the previous chapter, when Raphael describes to Adam and Eve how Satan's troops are crushed under Heaven's uprooted mountains, he also reveals that their bodies have thickened because of their sin. The pun on the word "wind" in Raphael's remark that Satan's troops took a long time to "*wind* / Out of" their warped suits of armor, compares the crushed spirits to the meteorological forces they will control in the fallen world and identifies their substance with the thick, vaporous part of the atmosphere where these forces predominate (6.659-61; my italics). But the play-on-words also suggests that the

spirits' resemble the "wind" inside of instruments.[59] As in Hell their exhalation-like bodies supply the wind and music emanating from its grand pipe organ, so in Heaven do they expel sounds from pipe-like chambers:

> Their armor helped their harm, crushed in and bruised
> Into their substance pent, which wrought them pain
> Implacable, and many a dolorous groan.
>
> (6.656-8)

The word "pent" used to describe the rebel angels' confinement within their metal armor evokes Francis Bacon's characterization of the disposition of the air inside of wind instruments and organs. Bacon uses this term repeatedly to describe the necessary physical conditions for propagating sound: "where the air is pent and straitened, there breath or other blowing, (which carry but a gentle percussion) suffice to create sound; as in pipes and wind-instruments."[60] The acoustical diction Milton uses to describe the constriction or penning in of the angels' vaporous bodies analogizes them to the air within musical instruments and represents their groans as the notes emitted by flutes or a pipe organ.

Early readers would be especially apt to visualize the demons as embodying instruments because of familiar representations in the visual arts. In the iconography

---

[59] Milton uses "wind" in a similarly witty vein to characterize the pneumatic conveyance of sound in *L'Allegro* ("Lap me in soft *Lydian* Aires, /…/ In notes with many a winding bout" [136-9]) and in *Comus* ("Wind me into the easie-hearted man" [163]). The word evokes the airy quality of sound that enables it to wiggle into physically and psychologically confined spaces. See John Milton, *Poems of Mr. John Milton* (London: printed by Ruth Raworth for Humphrey Moseley, 1645).

[60] Francis Bacon, *The Works of Francis Bacon*, vol. 2, 391, § 116. See also, for example, p. 404, § 164 and p. 422, § 232.

inspired by Athanasius' *Life of St. Anthony*, for instance, demons equipped with musical instruments and trumpet-shaped noses are often depicted as terrorizing the saint.[61] Jacques Callot's 1635 etching *The Temptation of St. Anthony* is particularly creative and grotesque in the variety of ways it imagines devils using musical instruments. Among other things, the picture portrays a band of infernal musicians, devils blowing instruments from the clouds, and trumpet-nosed creatures snorting dissonance at St. Anthony. In a few instances, demons with trumpets protruding from their backsides spew out what one presumes are toxic sounds and gasses. Though these representations may seem appalling to us, Callot's picture captures the early modern conception of the demonic body. Its organs are artificial rather than biological; they are incorporated musical instruments, engines, and implements with which to harass and deride man. Satan risks becoming like these musical cyborgs as he increasingly embodies his status as prince of the air and uses it as a platform for acoustical warfare. In the mountain-throwing episode, his troops fall victim to their own violent acoustical methods when crushed by their armor and unwillingly transformed into instruments. Their pitiful concert of groans ironically echoes Hell's "dulcet symphonies." It also anticipates Satan's instrumentation of Eve and the serpent, and finally, the moment in Book 10 when the devils are reduced to mere hissing serpents. Trapped in their suits of armor, their sounds are involuntary—a condition of their bodily imprisonment and punishment.

---

[61] See, for instance, Michelangelo*, The Torment of Saint Anthony*, c. 1487-88, The Kimbell Art Museum, Ft. Worth; Hieronymous Bosch, *Triptych of Temptation of St. Anthony*, c. 1500, Museu Nacional de Arte Antiga, Lisbon; Jacques Callot, *The Temptation of St. Anthony*, c. 1635, The Spencer Museum of Art, The University of Kansas.

In addition to portraying the devils' embodied instrumentality as the inheritance of sin, Raphael's account of the war in Heaven further reveals their meteorological procedure for lacing sounds with fraud. Satan's "hollow engines"—"deep-throated" instruments with mouths that roar, belch, and exhale smoke—illustrate the duplicitous and destructive aspects of his acoustics (Book 6, "Argument"). (The hollow engines also recall the hollow rocks with which the devils are compared in Book 2). The artillery causes havoc for the good angels in the usual way, by scattering their ranks with "Balls / Of missive ruin" (6.518-19, 590-99). But it also serves up a different kind of ammunition in the form of a piercingly loud and deceptive blast. By siphoning "sulphurous and nitrous" meteorological materials into their guns, Satan and his crew attempt to make a weapon that sounds as awful as thunder, the coveted armament of God.[62] They succeed at least in producing an exceedingly violent and startling sound, "embowel[ing] with outrageous noise the air" (6.588).

Milton's association of Satan's guns with instruments and emphasis on their booming sounds is not a historically anomalous treatment of cannon fire. Along with the vibrational sounds of stringed musical instruments, the report of guns and artillery was a central subject of acoustical investigation in the early seventeenth century. In *Sylva Sylvarum*, for instance, Bacon refers to the "noise of great ordnance," fired at long distances, as an example of how sound does not immediately reach our ears and travels at

[62] Satan predicts that on hearing (and feeling) the effect of his guns the angels will "fear we have disarmed / The thunderer of his only dreaded bolt" (6.490-1).

a slower speed than light.[63] Several of Bacon's seventeenth-century successors, including Marin Mersenne, Pierre Gassendi, and members of the Florentine Accademia del Cimento, actually attempted to measure the speed of sound using a technique called "blast-timing" which involved "timing the interval between seeing the flash and hearing the report of guns fired at a known distance."[64] Thus, in Milton's day guns were valued not only for their military function, but also for their extraordinary sonority; no other manmade sound was as loud.

If the blast of Satan's engines is meant to simulate the intimidating sound of thunder, then the initial appearance of the cannons augurs an altogether different kind of sound. To the "amused" angels, their shape expresses vocality:

> their mouths
> With hideous orifice gaped on us wide,
> Portending hollow truce.
>
> (6.576-78)

As the guns' novel appearance momentarily diverts the heavenly soldiers, arguably paving the way for their fall, early modern readers may have connected their appearance with that of the basilisk, an imposing-looking medieval cannon that was aptly named after a mythical serpent who kills its prey with a glance. Thus, while Adam and Eve could not have intuited the serpentine associations of the weapons in Raphael's tale, early

---

[63] Just after this observation about canon fire, Bacon proposes a method for measuring sound delay by standing at a great distance from a bell in a steeple and recording the difference between the moment it is observed as struck and the moment its peal is heard. See, *Sylva Sylvarum*, Century 3, 4:270.

[64] Frederick Vinton Hunt, *Origins in Acoustics: The Science of Sound from Antiquity to the Age of Newton* (New Haven and London: Yale University Press, 1978), 85. For information on the "blast-timing" experiments of Mersenne, Gassendi, and the scholars of the Accademia, see pp. 99-104.

audiences likely understood them as a direct type of the serpent in the garden, attributing their disarming appearance, shrewd mechanism, and savage acoustics to the latter Satanic instrument.

Raphael's tale of the invention of firearms has a dual purpose: it warns the first humans of Satan's slick acoustical tactics and then reveals the truly corrosive nature of his sounds. Satan initially appears as a deceptive maestro, adapting or emulating meteorological phenomena to fabricate machines whose amusing vocal appearance conceals their evil purpose. Later, the actual firing of the cannons reveals the lethal nature of these instruments. Raphael's description of these events affords Adam and Eve a unique opportunity to visualize the physically injurious quality of satanic sounds. The infernal and Paradisal climates sustain the illusion that Satan's sounds are benign by concealing his corruption within sweet music or charming rhetoric. Yet empyreal elements, like the "celestial temper" of Ithuriel's spear and the air of high Heaven, preclude such deceit by conspicuously announcing evil disturbances, either with flames or signs of torment (4.812, 6.244-45, 304-305). Thus, in Raphael's story, which takes place in Heaven, the sounds of Satan's guns do not dissemble. What the angels hear when the cannons go off ("outrageous noise") accurately reflects the ensuing damage: savage deformations of the air and the physical disorientation of the angels. In short, the episode warns Adam and Eve that satanic sounds pack a punch.

IV. SERPENT, "INSTRUMENT / OF MISCHIEF"

Each of the episodes discussed thus far shows Satan making and using different kinds of organs. The grand organ blast of the infernal council, the demons' embodiment of instruments in their metal garments of war, and their fabrication of military engines that are as brutally violent as they are loud, emphasize respectively the musical, corporeal, and technological definitions of organ. The demons' ability to fashion these organs and make each of them sound depends on their meteorological bodies, that is, their similarity to wind and the pneumatic ingredient in metals. Satan clearly draws on his embodied experience with organic devices when he inspires Eve's dream and animates the snake. But how does he counterfeit human speech in the body of an animal?

Satan's acoustical career may be said to culminate in his vocalization of the serpent, which under his influence becomes yet another sort of instrument. For early modern readers of *Paradise Lost*, this would have required no stretch of the imagination. As early as the sixteenth century, a wind instrument called the serpent was being used in France to accompany church choirs.[65] This impressive horn—some were over eight feet long—takes its name from the snaky shape of its tube, whose initial 'S' curve repeats itself in a wider loop at the bottom of the instrument.[66] That Milton was aware of this instrument is evident from its resemblance to Eden's serpent. Brass or other kinds of

[65] Murray Campbell, Clive Greated, and Arnold Myers, eds., *Musical Instruments: History, Technology, and Performance of Instruments of Western Music* (Oxford: Oxford University Press, 2004), 160. Traditionally, the inventor is given as Edmé Guillaume of Auxerre, France, and the date of invention, 1590.
[66] Campbell, Greated, and Myers, "Appendix 3: Brass Instrument Sizes" in *Musical Instruments*, 478. The nominal size of a typical serpent is 8-foot C, which makes the equivalent cone length 2.65m or about 8 foot 8 inches.

metal were sometimes used to make serpents; but they were typically constructed of wood and wrapped with leather.[67] Often, they were fitted with a brass crook, a piece of tube inserted between the mouthpiece and the body of the instrument in order to change its tone.[68] A flash of metal appears on Milton's serpent in the same place. We are told that he has a "burnished neck of verdant gold" (9.501). More significantly, the way the snake approaches Eve

> on his rear,
> Circular base of rising folds, that towered
> Fold above fold a surging maze,
>
> (9.497-9)

mirrors the ascending, folded appearance of the horn. It too has a "circular base"; the lowermost coil curls around until it almost closes. Furthermore the word "base," in Milton's description, may allude to the low register of the serpent whose deep tones were especially valued for filling out the bass parts in choral music.[69] According to Mersenne's account, the serpent is "capable of supporting twenty very strong voices," and its tone may be easily modulated, "so that it will be suitable to join with the soft voices of chamber music, whose graces and diminutions it imitates."[70] The versatility of the serpent matches the subtlety of Milton's snake, who shifts his tone mid-argument in response to Eve's faltering voice (9.664-7). If he had not witnessed a serpent being performed

[67] Mersenne, *The Books on Instruments*, book 5, p. 350. See also, Campbell, Greated, and Myers, *Musical Instruments*, 159-60.
[68] Campbell, Greated, and Myers, *Musical Instruments*, 160. Mersenne indicates that the crook, which he calls a tube, may be "ivory, horn, silver, or tin"; see *The Books on Instruments*, book 5, p. 353.
[69] Mersenne, *The Books on Instruments*, book 5, p. 353.
[70] Ibid.

himself, then Milton could have seen striking illustrations of them in Mersenne's *Harmonie Universelle* and Athanasius Kircher's *Musurgia Universalis*.[71]

Milton's characterization of Satan as an operator and maker of instruments appears all the more strategic in light of the fact that, in his day, serpents were actual instruments used in concert music to augment and imitate the human voice. Starting in the late Renaissance large organs began to be built with pipes that were designed to sound like the human voice.[72] Controlled with an organ stop called the Vox Humana, this feature is still used in theater organs today.[73] The two-pronged account of Satan's method of inspiring the serpent ("with serpent tongue / Organic, or impulse of vocal air") leads Hequembourg to the forked question: "Is the serpent more like a singer or more like a trumpet?"[74] Drawing such a dichotomy on the basis of these phrases, however, mistakenly ignores the polysemy of the word "organic" and its allusion to Satan's history of using, making, or becoming instruments. The narrator's interjection after the snake carefully tries his wiles on Eve, "So glozed the tempter, and his proem *tuned*," continues the idea that the serpent is being used instrumentally (9.549; italics added). Indeed, the fact that instrumental serpents were a feature of the Renaissance musical world argues that Satan speaks to Eve in the language of instruments—in a "tongue / Organic."

---

71 See Athanasius Kircher, *Musurgia Universalis* (Romae, Ex Typographia Haeredum Francisco Corbelletti. Anno Jubilaei. 1650), 6.4.505.

72 Campbell, Greated, and Myers, *Musical Instruments*, 393.

73 S.v. "Vox Humana/Voix Humaine/Voce Umana" in Bush and Kassel, *The Organ: An Encyclopedia*, 612.

74 "Milton's 'Unoriginal' Voice," 173.

Some pipe organ jargon is necessary to completely decipher this phrase. Organ pipes come in two different forms, flues and reeds; the former kind emits air through simple slit in the side of the pipe called a "mouth"; the latter type incorporates a metal reed called the "tongue."[75] The *OED* gives 1551 as the earliest date "tongue" was used in this precise context.[76] The positioning of the tongue is essential for tuning the organ pipe: "the choice of the sounding frequency is basically made by the reed, and the air column must follow."[77] Thus, the text's equivocation about how Satan manages what we might call "the serpent trick" reflects less on the agency of the snake—either way, it serves as an instrument—than on the tempter's technique. We must suspend in our minds two conceptions of Satan; the first is of a mechanical genius who uses the tuning mechanism of the tongue to determine the frequency of each syllable of the serpent's words. The second conception foregrounds the demonological significance of air; Satan, enclosed in the serpent, actually vibrates with sound, his aerial body serving as the column of moving air within an instrument.

When Beëlzebub asks for a volunteer in Book 2 to undertake the corruption of Earth he ominously suggests that there is no contrivance that can ensure the spirit's escape from exposure or secure his success: "what strength, what art can then / Suffice, or what evasion bear him safe" (2.410-1). But the case is not as hopeless as Beëlzebub implies. Satan already possesses a weapon proven to deceive and rattle even the most vigilant angels and thus assured to affect man. His implement is acoustical, a device

---

75 Campbell, Greated, and Myers, *Musical Instruments*, 387, 389.
76 S.v. "tongue, n. 14.c.," accessed September 10, 2015, www.oed.com.
77 Campbell, Greated, and Myers, *Musical Instruments*, 390.

actuated by his meteorological being and whose marvelous sound can deeply wound its hearer. Satan's manufacture of such devices in Hell, Heaven, Earth, and even within the minute compartments of the human mind, suggests that there is potential for Satanic instrumentation everywhere. Sound and its pervasive medium, air, are the byways through which he works. Uniting satanic instruments in Milton's epic is the multi-faceted figure of the organ. Through it Satan is represented as causing not only inanimate things, but also organisms, indeed the first humans themselves, to reverberate his deathly tune.

Conclusion

The eight-stanza-long fragment on the death of Jesus included in Milton's 1645 *Poems* ends abruptly with a dense conceit that references the sound of the poet's voice and the reception of the poem. It hypothesizes that his lament, if he took to weeping in the hills, would initiate a ripple of sympathetic echoes, and these sounds, in turn, might trick him into believing that his voice bred with a cloud:

> The gentle neighbourhood of grove and spring
> Would soon unboosom all thir Echoes milde,
> And I (for grief is easily beguild)
> Might think th'infection of my sorrows loud,
> Had got a race of mourners on som pregnant cloud.[1]

The conceit reflects the connection Milton continually makes in his poetry between sound and meteorological activity. Possibly writing around Easter, the year after he composed "The Nativity Ode" (1629), Milton draws a parallel in "The Passion" between the voice

[1] *Poems of Mr. John Milton: both English and Latin, Compos'd at several times* (London, 1645), 19, lines 52-6. This chapter's quotations are from this edition and will be cited in the text by line or page number (p.).

of the poet and that of Nature in the former work. As we saw in Chapter 1, the figure of Nature in "The Nativity Ode" coaxes the air with "speeches fair" to cover her body with snow, and similarly, in the lines above, the poet's voice seems to make the clouds fertile.

Given that Milton imagines his "sorrows loud" in the final stanza of "The Passion" as mirroring the role of Nature's vocal exhalation in the earlier companion poem, with his voice replacing the World-Spirit or universal breeze as commander of the elements, we might expect the poem to end with a confident assertion of the poet's genius. But in fact, the substitution casts doubt on his ability to speak incorruptly. The poet's cries trigger a chain of deceptive acoustical effects: echoes that sound like the sobs of an imagined "race of mourners" sprung from the union of his voice with a cloud. Underlying this peculiar image is Pindar's story of Ixion, who couples with a cloud that Zeus forms in the shape of Juno and consequently fathers the deformed race of creatures known as centaurs. The allusion to Ixion's wrongful passion compromises Milton's portrayal of his own voice and implicates the atmosphere in its false reproduction. As the sound of his lament travels into the world and interacts with the environment the poet finds himself deceived by its reflections and alarmingly confronted with their phantom offspring. It is hardly surprising, then, that Milton abruptly breaks off the poem at the word "cloud," and later declares its "*[s]ubject…to be above the yeers he had, when he wrote it,*" and himself "*nothing satisfi'd with what was begun*" (p. 19). Even as he bravely imagines amplifying his voice in the final stanza by releasing it into the air, the inescapable association of the air with menacing spiritual bodies determines his choice of

imagery and prevents his success. Milton's identification of his voice with Ixion's transgressive act cannot be reconciled with the sober subject of the poem.

The problem that silences Milton at the end of "The Passion"—sound's vulnerability to acoustically corruptive or distorting forces of air—in other works, he vigorously pursues. Chapter 1 examines "The Nativity Ode," Milton's first serious meditation on the theme. Nearly finished with his baccalaureate and fresh from reading Greco-Roman natural philosophy, Milton draws on the ancient science of meteorology in that poem to portray the air and its natural motions as intrinsically acoustical, vocal, and animate. In depicting sounds and voices in "The Nativity Ode" as attributes of the environment rather than of individuals and society, the poem delineates a cosmography of acoustics and emphasizes the physical and spiritual factors at play in the material of sound. The memorable concluding segment of the poem affirms Milton's view that Christ was born to root out spiritual influence from the air and make space on earth for holy sound. We see this in the distinctly aural and ecological processes by which the pagan gods and oracles are made to leave the world. "The Nativity Ode" is the first work in Milton's oeuvre that explicitly acknowledges that the air and weather harbor evil agents whose bodily presence in the atmosphere compromises earthly acoustics.

Milton's reference in "The Nativity Ode" to meteorological principles and Stoic cosmology to explain the repercussions—acoustical and otherwise—of the Incarnation anticipates the diversity of intellectual influences that informs his representations of sound in subsequent works. I have argued that the corporeality of sound and its embodiment in air are basic pillars of Milton's acoustics. The materialism of this position

aligned him with a growing number of advocates in the late Renaissance of a new physical and experimental approach to acoustics. With its central conflict revolving on the aural sensations of its protagonist, *Comus* illustrates both the increasing influence of empiricism in early seventeenth-century acoustics and the continuing usefulness of magic for conceptualizing the interior—what we now call "psychological"—effects of aural phenomena. The masque depicts several acoustical occurrences that interested early experimentalists, but also stages mysterious aspects of aural sensation that they lacked the physical and biological knowledge to explain fully. One such feature of aural experience is the feeling of spiritual restoration and/or depletion resulting from sound's penetrations of the body. Because it emphasized the similarity between sound and spirit, occult theory offered a deeper and more compelling account of this phenomenon than the new science was capable of giving. Thus, we find traces of the writings of Ficino and other Renaissance magi in the incantatory quality of the masque's acoustics, and in its representation of the moral and physiological effects of sound.

Guiding Milton's even-handed synthesis of old and new scientific principles in his representation of sound is his monistic vitalism, which insists that body and spirit are composed of an original unitary and vital matter. This philosophy dictates that entire the universe is material, including its invisible parts. In this respect, Milton's natural and moral philosophies accommodate the new acoustical models insofar as they exclude the operation of incorporeal phenomena and emphasize the interaction of the air and machines. But another implication of Milton's particular form of monism—the animist notion that all matter is alive and instinct with spirit—clashes with the mechanical

philosophy's skepticism of hidden causes. Thus, in addition to integrating new research on sound, Milton's acoustics draws on an array of older intellectual traditions that reinforce the spiritual vitality of matter. The agglomeration of occult, theological, and folkloric ideas that characterize the spiritual agency of the atmosphere in *Comus* and the epics evinces an intensified effort in the late poetry to reveal and explain the existence of a *living* component of sound.

Paradise Lost and *Paradise Regained* reaffirm and expand on the idea first introduced in "The Nativity Ode," "The Passion," and *Comus*, that the fallen atmosphere harbors corrupt, yet living, spiritual agents. As we saw in Chapter 3, Milton anchors the epics' depiction of atmosphere in the Christian doctrine that identifies Satan with "the prince of the power of the air" (*Eph*. 2:2) and underlies early modern beliefs about the potential diabolism of weather. Echoing characterizations of the fallen angels by the medieval Church, Milton represents the devils in *Paradise Lost* as having bodies similar to cloud or exhalation. Using meteorological characterization in *Paradise Lost* to manifest the fallen angels' deteriorated condition—physically and morally speaking—Milton foreshadows Satan's eventual installment as prince of the air in the sequel epic and provides a history of inclement weather that reflects contemporary notions of air.

Modern readers often assume that the weather changes depicted in Book 10 of *Paradise Lost* are a direct consequence of the human fall—God causes the earthly climate to grow harsher to punish the disobedient humans and accomplish divine justice. But the weather alterations compound a climatological shift that was already set in motion by the rebel angels whose fall triggered their bodily metamorphoses into powers

of air and weather. The human fall precipitates a just diminution of the earth's perfect prelapsarian climate; but the worsening weather in Book 10 also marks the confluence of demonic spirit into the air and the advent of Satan's atmospheric princedom.

The verses on heavenly music and the cessation of the oracles in "The Nativity Ode" imagine how the air might sound were it cleansed of the noxious spiritual burden it assumes at the Fall. But decades after Milton wrote "The Nativity Ode," when the political climate had turned hostile to the expression of Republican values, his interest lay in describing the fallen air rather than its purified counterpart. Perhaps as he aged the possibility that sound and other movements of the atmosphere could ever be safe from the contamination of sinister influences seemed increasingly remote. His epic, thus, not only develops an elaborate, theologically and culturally acceptable mythology for explaining the atmosphere's spiritual corruption, but also illustrates how its investment with evil spiritual bodies endangers the integrity of sound—from the inside out.

As we have seen, Milton begins to investigate the potential instability of acoustic material in his early works, especially in *Comus*, which shows that the darkness of air, its fogginess, and susceptibility to magical alteration, compromises the sounds moving through it. Since a crucial element of *Paradise Lost* involves acoustic subterfuge, with Satan using an aural method to corrupt Eve and instrumentalize the serpent, this later work also includes extensive acoustical explication. It substantiates implications from earlier works, especially the notion that meteorological factors may fundamentally influence the quality of aural communications. In depicting Satan's exercise of his aerial power, the epic illustrates the relationship between weather and sound that "The Nativity

Ode" and *Comus* establish, and reveals with greater specificity than previous works, how Satanic agents exploit this relationship.

To support his conception of Satanic acoustics in *Paradise Lost*, Milton integrates theory, vocabulary, and imagery from the same fields that inform his previous representations of sound: classical meteorology, the occult sciences, and the new experimentalism. But since the writing of *Comus,* the mechanical philosophy had advanced significantly, and experimenters made several new determinations regarding sound. One of the more notable developments in acoustics, the mathematical law established by Mersenne for determining the frequency of a stretched string, was confirmed by actual experiments involving a stringed apparatus. His approach to investigating the frequency of strings and other properties of sound advanced the experimental style employed by Vincenzo Galilei and his son. Through the efforts of all three philosophers, "the musical instrument was turned into a scientific instrument, capable of revealing nature's hidden properties."[2] Much like these sound scientists, Milton in *Paradise Lost* stresses the capacity of musical instruments to reveal, extend, and even artificially replicate previously hidden or opaque processes of Nature, such as the ability to form human speech. Thus, as we saw in Chapter 3, Satan is repeatedly depicted in *Paradise Lost* as fashioning and using instruments in various settings to imitate natural sounds, including the soothing harmonies of Heaven and the deafening blast of thunder. His skill with instruments, as I show, translates into the ability to

[2] H. F. Cohen, *Quantifying Music: The Science of Music at the First Stage of the Scientific Revolution, 1580-1650* (Dordrecht: D. Reidel Publishing, 1984), 102.

manipulate the analogous organic structures controlling Eve's fancy and the serpent's voice. That Milton invokes instrumental and organic diction to describe such disparate subjects as the temple in Hell, the satanically manipulated anatomy of Eve and the serpent, and the devils' embodiment of acoustical devices, suggests his sympathetic view of the increasingly popular notion that mechanism characterizes motion at every level of the physical world. Satanic acoustics makes this radical aspect of the poem visible. But it also reminds us of Milton's abiding animistic beliefs. By consistently portraying the devils' meteorological power as centrally involved in either the process of fabricating instruments or in their actual performance, Milton suggests that mechanical action is dependent on the implicit, living part of matter—the spirit that inhabits the wind.

Long after Milton's youthful and ultimately abortive attempt to mourn the crucifixion in verse, he returned to the subject of Christ's life in *Paradise Regained*. In this work, he offers a much more defined picture of the corruptive and deceptive power of the atmosphere. In the interval between these poems, his concept of sound deepened as he wrote poetry that explores multiple perspectives in acoustics, examines the polluted materials of sound, and considers whether and how holy sound can thrive in the fallen atmosphere. In his final epic, the acoustical menace of the air no longer appears as a spectral unknown, as it is portrayed in "The Passion" where the poet only *suspects* that the air may cause him to misinterpret. The source of this danger in *Paradise Regained* is named and familiar. The tempter's several conjurations—the storm, banquet, and litany of false appeals—are all unequivocally identified with the Prince of the Air. The shift that occurs in Milton's acoustical knowledge, from suspicion to informed opinion, mirrors the

stages of the empirical method. In consulting a wide spectrum of intellectual traditions to support an initial hypothesis about sound, Milton's philosophical approach to aural representation reflects the spirit of scientific investigation that took hold during his lifetime.

Milton's lifelong willingness to incorporate new and even controversial insights about the physical world into his philosophical poetry raises questions about the extent to which he absorbed and responded to the scientific discoveries made in the latter part of the seventeenth century about the nature of air. *Paradise Regained* and *Samson Agonistes* were published at a pivotal moment in the history of the physics of air. In the decade leading up to the publication of Milton's 1671 volume, Robert Boyle conducted experiments with a pneumatic pump, providing a mechanical definition of air and determining that sound cannot exist in a vacuum. In the year that Milton's final two poems were printed, Ralph Bohun's *Discourse concerning the Origine and Properties of Wind* likened the atmosphere to an aeolipile or a basic steam engine. Other mid-century Oxford chemists, such as Thomas Willis, John Mayow, and Robert Hooke, argued for the particulate nature of the air, and some construed meteorological events as the interaction of volatile chemical substances.[3] This dissertation suggests that, if Milton knew of them, he would have been deeply interested in the mechanical and atomistic theories of air that gained acceptance during the latter part of his career. A longer project might fruitfully

[3] See Jan Golinski, *British Weather and the Climate of Enlightenment* (Chicago: Chicago UP, 2007), 22, for a description of the contributions of Bohun, Willis, Mayow, and Hooke.

describe their influence on his account of sound and integration of mechanism into his aural conception of atmosphere.

This dissertation has avoided a monolithic approach to defining early modern "science." As it was used in the seventeenth century, the term "science" could refer to any kind of knowledge acquired by study, and early modern subjects that now fall under the umbrella of modern science—chemistry, physics, and acoustics, for example—rested on principles borrowed from older or alternative disciplines. Milton's balanced selection of ideas from the new experimentalism and older traditions such as the occult philosophy in his representations of sound suggests that the line between modern and pre-modern fields was much blurrier in the seventeenth century than it appears to us now. By casting a wide net, Milton also implies that no single intellectual system can adequately account for the variety and vitality of God's creation. His poetry thus conjoins new science and precedent traditions to achieve a vision of the physical world at once informed by experiment and compatible with his theology.

Milton's integration of magic into his acoustical representations, through allusion to occult teachings or various kinds of enchantments, often serves to illustrate the incompleteness or inadequacy of empirical science as a guide to knowing the natural world. But magic and the mechanical arts are also presented as equally repugnant features of the Satanic character. The tension between these perspectives, I suggest, derives from Milton's belief in the reality of magic on the one hand, and the knowledge, on the other, that it may be falsified and abused. One of this dissertation's key insights, that a technical understanding of sound and/or music in this period entails a concomitant

assessment of the occult, has broader applications for criticism on Milton and all literature of the Renaissance. Milton's relationship to the occult has been largely overlooked, but it offers insight into his idea of the limitations of experimental science as well as his concept of his own poetic art. In “The Passion,” Milton seems to regard his own voice as a potential vehicle of magical power, however, not one that benefits him or others. He imagines that his loud lament may produce an illusion that could deceive and surround him with phantom mourners. One can interpret this description as admitting doubt that his poem will arouse his audience’s sympathies and that he may be deceived in his abilities. But it also likens the poet to a magician figure like Comus who casts spells into the “spungy ayr,” which take shape the Lady’s memory as “airy tongues.” As yet uninitiated to the science of sound, the young poet is paralyzed by the traditional association of sound and magic and by the idea that he may himself engender corrupt sounds. He has not yet learned the Attendant Spirit’s injunction: “[n]ot a waste or needless sound.”

Bibliography

Agrippa, Cornelius. *Of the Vanitie and Uncertaintie of Artes and Sciences*. Translated by James Sanford. London, 1569.

———. *Three Books of Occult Philosophy, written by Henry Cornelius Agrippa, Translated out of the Latin into the English Tongue, by J.F*. London, 1651.

Algra, Keimpe. "Stoics on Souls and Demons: Reconstructing Stoic Demonology." In *Demons and the Devil in Ancient and Medieval Christianity*, edited by Nienke Vos and Willemien Otten. Leiden: Brill, 2011.

Algra, Keimpe, Jonathan Barnes, Jonathan Barnes, Jaap Mansfeld, and Malcolm Schofield, eds. *The Cambridge History of Hellenistic Philosophy*. Cambridge: Cambridge University Press, 1999.

Aquinas, Thomas. "Expositio super Job ad litteram." In *S. Thomae Aquinatis Opera Omnia*, edited by Roberto Busa. 7 Vols. Stuttgart-Bad Cannstatt: Frommann-Holzboog, 1980.

———. *The Literal Exposition of Job: A Scriptural Commentary Concerning Providence*. Translated by Anthony Damico. Vol. 38 of *The Collected Works of St. Thomas Aquinas. Electronic Edition*. 47 vols. Charlottesville, VA: InteLex Corp., 1993.

Aristotle, *De Generatione et Corruptione*. Translated by C. J. F. Williams. Oxford: Clarendon Press, 1982.

———. *Meteorologica*. Translated by H. D. P. Lee. Loeb Classical Library. Cambridge, MA: Harvard University Press, 1952.

Arnold, Clinton E. *Ephesians: Power and Magic: The Concept of Power in Ephesians in Light of its Historical Setting*. Cambridge: Cambridge University Press, 1989.

Athanasius. "The Life and Affairs of Our Holy Father Antony." In *Athanasius: The Life of Antony and The Letter to Marcellinus*, edited and translated by Robert C. Gregg. New York: Paulist Press, 1980.

Augustine. "Books VIII-XI." Translated by David S. Wiesen. Vol. 3 of *The City of God against the Pagans*, edited by George E. McCracken. 7 Vols. London: William Heinemann, 1968.

———. "Books 1-6." Vol. 1 of *St. Augustine: The Literal Meaning of Genesis*. Edited and translated by John Hammond Taylor. 2 Vols. New York: Newman Press, 1982.

Bacon, Francis. *Of the Dignity and Advancement of Learning*. In *The Works of Francis Bacon*, edited by James Spedding, Robert Ellis, and Douglas Heath, 275-498. Vol. 4 of 14. London, 1857.

———. *Sylva Sylvarum*. In Spedding, Ellis, and Heath, eds., *The Works of Francis Bacon*, 2: 339-672.

Blair, Ann. *The Theater of Nature: Jean Bodin and Renaissance Science*. Princeton: Princeton University Press, 1997.

Bodin, Jean. *Universae Naturae Theatrum*. Lyon, 1596.

Boethius, Anicius Manlius Severinus. *De institutione musica* in *Anicii Manlii Torquati Severini Boetii De Institutione Arithmetica Libri Duo De Institutione Musica Libri Quinque*, ed. G. Friedlein. Leipzig, 1867.

Brown, Cedric C. *John Milton's Aristocratic Entertainments*. Cambridge: Cambridge University Press, 1985.

Burnett, Charles. "Sound and its Perception in the Middle Ages." In Burnett, Fend, and Gouk, eds., *The Second Sense*, 43-69.

Burnett, Charles, Michael Fend and Penelope Gouk, eds. *The Second Sense: Studies in Hearing and Musical Judgement from Antiquity to the Seventeenth Century*. London: The Warburg Institute University of London, 1991.

Bush, Douglas Earl, and Richard Kassel. *The Organ: An Encyclopedia*. New York: Routledge, 2006.

Butler, Charles. *The Principles of Musik, in Singing and Setting: With the Two-fold use Thereof*. London, 1636.

Campbell, Murray, Clive Greated, and Arnold Myers, eds. *Musical Instruments: History, Technology, and Performance of Instruments of Western Music*. Oxford: Oxford University Press, 2004.

Cohen, H. F. *Quantifying Music: The Science of Music at the First Stage of the Scientific Revolution, 1580-1650*. Dordrecht: D. Reidel Publishing, 1984.

Coleman, Satis N. *Bells: Their History, Legends, Making, and Uses*. Chicago: Rand McNally & Company, 1928.

Costello, William. *The Scholastic Curriculum at Early Seventeenth-Century Cambridge*. Cambridge, MA: Harvard University Press, 1958.

Cox, J. Charles. *Cornwall*. London: G. Allen & Company, ltd., 1912.

Cummins, Juliet, and David Burchell, eds. *Science, Literature and Rhetoric in Early Modern England*. Aldershot, England: Ashgate, 2007.

Danielson, Dennis. "Astronomy." In *Milton in Context*, edited by Stephen Dobranski, 213-25. Cambridge: Cambridge University Press, 2010.

della Porta, Giambattista. *Natural magick*. London, 1669.

Descartes, René. *Principles of Philosophy*. Translated by Valentine Rodger Miller and Reese P. Miller. Dordrecht: Kluwer Academic Publishers, 1982.

Dickson, Arthur. *Valentine and Orson: A Study in Late Medieval Romance*. New York: Columbia University Press, 1929.

Duran, Angelica. *The Age of Milton and the Scientific Revolution*. Pittsburgh: Dusquesne University Press, 2007.

Edwards, Karen. *Milton and the Natural World: Science and Poetry in* Paradise Lost. Cambridge: Cambridge University Press, 1999.

Eichholz, D. E. "Aristotle's Theory of the Formation of Metals and Minerals." *The Classical Quarterly* 43 (1949): 141-6.

Eliot, T. S. *On Poetry and Poets*. London: Faber and Faber, 1957. Reprint, New York: Farrar, Straus & Giroux, 1970.

Evans, J. Martin. *The Miltonic Moment*. Lexington, KY: The University Press of Kentucky, 1998.

Evelyn, John. *The Diary of John Evelyn*. Edited by William Bray. Washington [D.C.]: M. Walter Dunne, 1901.

Fallon, Stephen M. *Milton Among the Philosophers: Poetry and Materialism in Seventeenth-Century England*. Ithaca: Cornell University Press, 1991.

Ficino, Marsilio. *Opera Omnia*. Basileae, 1576.

———. *Three Books on Life*. Translated by Carol V. Kaske and John R. Clark. Binghamton, NY: Medieval & Renaissance Texts & Studies in conjunction with The Renaissance Society of America, 1989.

Finney, Gretchen Ludke. *Musical Backgrounds for English Literature: 1580-1650*. New Brunswick, NJ: Rutgers University Press, 1962.

Fitzgerald, Allan D., ed. *Augustine through the Ages: An Encyclopedia*. Grand Rapids, MI: William B. Eerdmans Publishing, 1999.

Froidmondi, Liberti. *Meteorologicorum Libri Sex*. London, 1656.

Frytsche, Marcus. *Meteorum, hoc est Impressionum Aerearum et Mirabilium Naturae Operum*. Wittenberg: Cratoniana, 1598.

Furley, David. "Cosmology." In Algra et al., eds., *Cambridge History of Hellenistic Philosophy*, 440-41.

Garber, Daniel. "Remarks on the Pre-History of the Mechanical Philosophy." In Roux and Garber, eds., *The Mechanization of Natural Philosophy*, 3-26.

Golinski, Jan. *British Weather and the Climate of Enlightenment*. Chicago: Chicago University Press, 2007.

Gouk, Penelope. *Music, Science, and Natural Magic in Seventeenth-Century England*. New Haven: Yale University Press, 1999.

———. "Music in Francis Bacon's Natural Philosophy." In Gozza, *Number to Sound*, 135-52.

———. "Transforming Matter, Refining the Spirit: Alchemy, Music and Experimental Philosophy around 1600." *European Review* 21, no. 2 (2013): 147-9.

Gozza, Paolo, ed., *Number to Sound: The Musical Way to the Scientific Revolution*. Dordrecht: Kluwer Academic Publishers, 2000.

Grant, Edward. *A History of Natural Philosophy: From the Ancient World to the Nineteenth Century*. Cambridge: Cambridge University Press, 2007.

Henry, John. *The Scientific Revolution and the Origins of Modern Science*. 2nd ed. Houndmills, UK: Palgrave, 2002.

Hequembourg, Stephen. "Milton's 'Unoriginal' Voice: Quotation Marks in *Paradise Lost*." *Modern Philology* 112, no. 1 (2014): 154-78.

Hollander, John. *The Untuning of the Sky: Ideas of Music in English Poetry, 1500-1700*. Princeton, NJ: Princeton University Press, 1961.

Hoxby, Blair. "The Wisdom of Their Feet: Meaningful Dance in Milton and the Stuart Masque." *English Literary Renaissance* 37 (2007): 74-99.

Hunt, Frederick Vinton. *Origins in Acoustics: The Science of Sound from Antiquity to the Age of Newton*. New Haven: Yale University, 1978.

Kelley, Maurice, and Samuel D. Atkins. "Milton's Annotations of Aratus." *PMLA* 70 (Dec. 1955): 1090-1106.

Kingsley, Peter. *Ancient Philosophy, Mystery, and Magic: Empedocles and Pythagorean Tradition*. Oxford: Clarendon Press, 1995.

Kircher, Athanasius. *Musurgia Universalis*. Rome, 1650.

Klein, Robert. *Form and Meaning: Essays on the Renaissance and Modern Art*. New York: The Viking Press, 1970.

Leavis, F. R. "Milton's Verse." *Scrutiny* 2 (1933): 123-36.

Leonard, John. *Style and Genre*. Vol. I of *Faithful Labourers: A Reception History of* Paradise Lost, 1667-1970. Oxford: Oxford University Press, 2013.

Lewis, Elizabeth Jayne. *Air's Appearance: Literary Atmosphere in British Fiction, 1660-1794*. Chicago: The University of Chicago, 2012.

Lindberg, David C., and Robert S. Westman, eds. *Reappraisals of the Scientific Revolution*. Cambridge: Cambridge University Press, 1990.

Lombard, Peter. *On Creation*. Book 2 of *The* "*Sentences*." 4 books, translated by Giulio Silano. Toronto: Pontifical Institute of Mediaeval Studies, 2008.

Long, A. A. *Hellenistic Philosophy: Stoics, Epicureans, Sceptics*. 2nd edition. Berkeley: University of California Press, 1986.

———. "Stoic psychology." In Algra et al., *Cambridge History of Hellenistic Philosophy*, 560-84.

Longfellow, Henry Wadsworth. *The Golden Legend*. London, 1854.

Lucretius. *De Rerum Natura*. Translated by W. H. D. Rouse. 2nd ed. Cambridge: Cambridge Univ. Press, 1982.

———. *On the Nature of Things*. Translated by Cyril Bailey. Oxford: Clarendon Press, 1921.

Luther, Martin. *Table Talk*. Edited and translated by Theodore G. Tappert. Vol. 54 of *Luther's Works*, edited by Helmut T. Lehmann. 55 Vols. Philadelphia: Fortress Press, 1967.

Lynch, Rev. J. S. M. *Rite of the Blessing of a Bell, or of Several Bells, According to the Roman Pontifical*. New York: The Cathedral Library Association, 1912.

Magnus, Albertus. *De Anima*. Edited by Clemens Stroick. Vol. 7 of *Opera Omnia*. Münster, Germany: Monasterii Westfalorum in Aedibus Aschendorff, 1955.

Mancosu, Paolo. "Acoustics and Optics." In *Cambridge History of Science, Volume 3: Early Modern Science*, edited by Katharine Park and Lorraine Daston, 596-631. Cambridge: Cambridge University Press, 2006.

Marcus, Leah. *The Politics of Mirth: Jonson, Herrick, Milton, Marvell, and the Defense of Old Holiday Pastimes*. Chicago: The University of Chicago Press, 1986.

Marjara, Harinder. *Contemplation of Created Things: Science in* Paradise Lost. Toronto: University of Toronto Press, 1992.

Martin, Craig. "Causation in Descartes' *Les Meteores* and Late Renaissance Aristotelian Meteorology." In Roux and Garber, eds., *The Mechanization of Natural Philosophy*, 217-36.

———. *Renaissance Meteorology: Pomponazzi to Descartes*. Baltimore: Johns Hopkins University Press, 2011.

Masson, David. *The Life of John Milton*. Cambridge: Macmillan and Co., 1859.

McGuire, Maryann Cale. *Milton's Puritan Masque*. Athens: University of Georgia Press, 1983.

Mersenne, Marin. *The Books on Instruments*. Translated by Roger E. Chapman. The Hague, Netherlands: Martinus Nijhoff, 1957.

Milton, John. *The Complete Poetry and Essential Prose of John Milton*. Edited by William Kerrigan, John Rumrich, and Stephen M. Fallon. New York: Modern Library, 2007.

———. *Complete Prose Works of John Milton*. Edited by Don M. Wolfe. 8 vols. New Haven: Yale University Press, 1953–82.

———. *The Complete Shorter Poems*. Edited by John Carey. 2nd ed. Harlow, England: Longman, 2007.

———. *The Essential Prose of John Milton*. Edited by William Kerrigan, John Rumrich, and Stephen M. Fallon. New York: Random House, 2007. Reprint, New York: Modern Library, 2013.

———. *Paradise Lost. A Poem in Twelve Books*. London, 1674.

———. *Paradise Lost*. Edited by Alastair Fowler. 2nd ed. London: Longman, 1998.

———. *Poems of Mr. John Milton*. London, 1645.

———. *The Works of John Milton*. Edited by Frank Allen Patterson. 18 vols. New York: Columbia University Press, 1931-38.

Minear, Erin. *Reverberating Song in Shakespeare and Milton: Language, Memory, and Musical Representation*. Surrey, England: Ashgate, 2011.

Norbrook, David. "The Reformation of the Masque." In *The Court Masque*, edited by David Lindley, 94-110. Manchester: Manchester University Press, 1984.

OED Online. March 2016. Oxford University Press. http://www.oed.com/.

Osler, Margaret J., ed. *Rethinking the Scientific Revolution*. Cambridge: Cambridge Univ. Press, 2000.

Picciotto, Joanna. *Labors of Innocence in Early Modern England*. Cambridge, MA: Harvard University Press, 2010.

Plato, *Timaeus*. Translated by R. G. Bury. Vol. 9 of *Plato in Twelve Volumes*. 1929. Reprint, Cambridge, MA: Harvard University Press, 1989.

Pliny the Elder. *Natural History*. Translated by H. Rackham. Vol. 1. Cambridge, MA: Harvard University Press, 1938.

Polsue, Joseph. *A Complete Parochial History of the County of Cornwall*. Vol. 2. Truro, UK, 1868.

Pontificale Romanum Clementis VIII. Paris, 1615.

Praetorius, Michael. *Syntagma Musicum*. Edited and translated by David Z. Crookes. Vol. 2 of *De organographia*. Oxford: Clarendon Press, 1986.

Ptolemy. *Ptolemy's Tetrabiblos: Or, Quadripartite; Being Four Books of the Influence of the Stars*. Translated and edited by J.M. Ashmand. London: W. Foulsham & Co., 1917-1936.

Rogers, John. *The Matter of Revolution: Science, Poetry, and Politics in the Age of Milton*. Ithaca: Cornell University Press, 1996.

Rossi, Paolo. *Francis Bacon: From Magic to Science*. Translated by Sacha Rabinovitch. London: Routledge & Kegan Paul, 1968.

Roux, Sophie, and Daniel Garber, eds. *The Mechanization of Natural Philosophy*. Dordrecht: Springer, 2013.

a Sancto Paulo, Eustachius. *Tertia Pars Summa Philosophiae, Quae est Physica*. Vol. 2 of *Summa Philosophiae Quadripartite de Rebus Dialecticis, Moralibus, Physicis et Metaphysicis*. 2 vols. Paris, 1609.

Seneca, Lucius Annaeus. *Naturales Quaestiones*. Translated by Thomas H. Corcoran. Vol. 2 of *Seneca in Ten Volumes*. Cambridge, MA: Harvard University Press, 1972.

Shakespeare, William. *The Comical History of the Merchant of Venice, or Otherwise Called the Jew of Venice*. In *The Norton Shakespeare*, edited by Stephen Greenblatt, 1090-145. New York: W. W. Norton, 1997.

Sherry, Beverley. "Milton, Materialism, and the Sound of *Paradise Lost*." *Essays in Criticism* 60, no. 3 (2010): 220-41.

Shumaker, Wayne. *The Occult Sciences in the Renaissance: A Study in Intellectual Patterns*. Berkeley: University of California Press, 1972.

Smith, William, and Samuel Cheetham, eds. *Dictionary of Christian Antiquities*. Vol. 1. London, 1876.

Sohm, Philip L. "Palma Vecchio's *Sea Storm*: A Political Allegory." *RACAR* 6, no. 2 (1979-80): 85-96.

Spaeth, Sigmund. *Milton's Knowledge of Music*. Princeton University Library, 1913. Reprint, Ann Arbor: The University of Michigan, 1963.

St. Jerome. "Ephesians 6:12." In *The Commentaries of Origen and Jerome on St Paul's Epistle to the Ephesians*, edited by Ronald E. Heine. Oxford: Oxford University Press, 2002.

Taub, Liba. *Ancient Meteorology*. London: Routledge, 2003.

Treip, Mindele Anne. *Allegorical Poetics and the Epic: The Renaissance Tradition to* Paradise Lost. Lexington: University Press of Kentucky, 1993.

Verity, A. W., ed. "Appendix D: Paradise Lost, I.515-17." In *Paradise Lost*, edited by Verity. Cambridge: Cambridge University Press, 1910.

Walker, D. P. "The Astral Body in Renaissance Medicine." *Journal of the Warburg and Courtauld Institutes* 21 (1958): 119-33.

———. "Francis Bacon and *Spiritus*." In *Music, Spirit and Language in the Renaissance*, edited by Penelope Gouk, 121-30. London: Varorium Reprints, 1985.

———. *Spiritual and Demonic Magic: From Ficino to Campanella*. London: The Warburg Institute, University of London, 1958.

Walters, H. B. *Church Bells of England*. London: Henry Frowde, 1912.

White, Andrew D. *A History of the Warfare of Science with Theology in Christendom*. 2 Vols. New York: D. Appleton, 1915.

Wilkins, John. *Mathematical Magick: or, The Wonders that May be Performed by Mechanichal Geometry. In Two Books*. London, 1680.